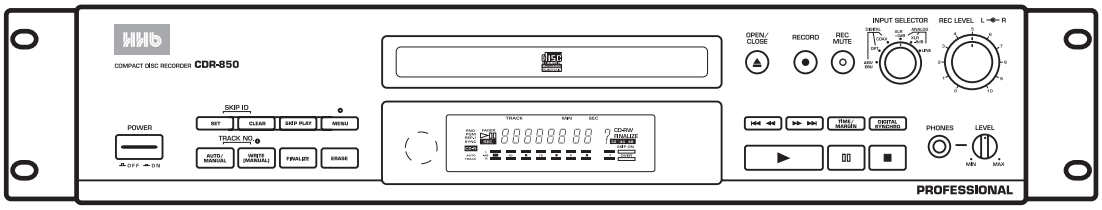
PROFESSIONAL COMPACT DISC RECORDER **CDR-850**



Service Manual

THIS MANUAL IS APPLICABLE TO THE FOLLOWING MODEL(S) AND TYPE(S).

Type	Model	Power Requirement	Remarks
	CDR-850		
KU/CA	◯	AC120V	
MY	◯	AC220-230V	

FOR U.S. MODELS

NECESSARY INFORMATION FOR DHHS RULES MARKED ON THE REAR BASE AND ON THE TOP OF CD MECHANISM AS BELOW.

DANGER – LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.

COMPACT disc DIGITAL AUDIO Recordable ReWritable

1. SAFETY INFORMATION

This service manual is intended for qualified service technicians ; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING
This product contains lead in solder and certain electrical parts contain chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm.

Health & Safety Code Section 25249.6 – Proposition 65

NOTICE
(FOR CANADIAN MODEL ONLY)
Fuse symbols (fast operating fuse) and/or (slow operating fuse) on PCB indicate that replacement parts must be of identical designation.

REMARQUE
(POUR MODÈLE CANADIEN SEULEMENT)
Les symboles de fusible (fusible de type rapide) et/ou (fusible de type lent) sur CCI indiquent que les pièces de remplacement doivent avoir la même désignation.

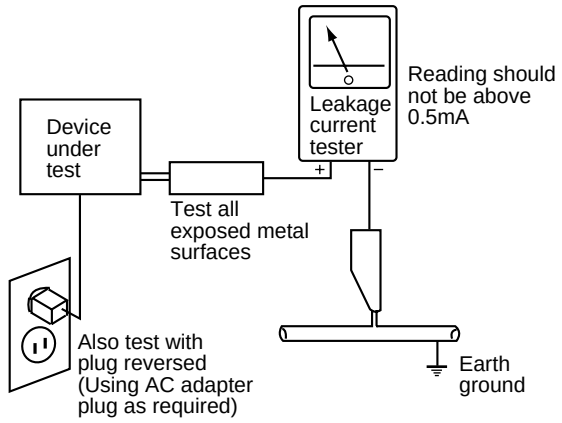
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Reading should not be above 0.5mA
Leakage current tester
+
–
Device under test
Test all exposed metal surfaces
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

LABEL CHECK

MY Type

VARO!
Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Älä katso säteeseen.
VARNING!
Osynlig laserstrålning när denna del är öppnad och spärren är urkopplad. Betrakta ej strålen.
PRW1233

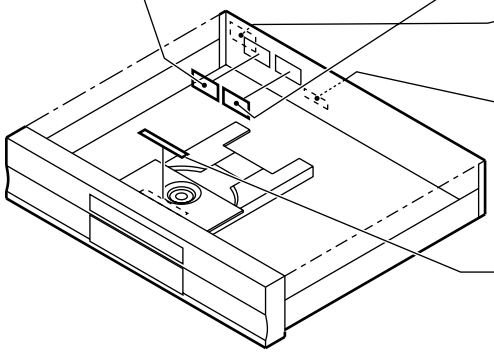
MY Type

ADVARSEL
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHED SAFBRYDERE ER UDE AF FUNKTION.
UNDGÅ UDSÆTTELSE FOR STRÅLING.
VORSICHT!
UNSICHTBARE LASER-STRAHLUNG TRITT AUS, WENN DECKEL (ODER KLAPPE) GEÖFFNET IST! NICHT DEM STRAHL AUSSETZEN!
VRW1094

MY Type

CLASS 1
LASER PRODUCT

Printed on Rear Panel



KU/CA type

DANGER — LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM

Printed on Rear Panel

DANGER — LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM. PRW1516-A

IMPORTANT

THIS PIONEER APPARATUS CONTAINS LASER OF CLASS III b.
SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUTED PERSON.

LASER DIODE CHARACTERISTICS

MAXIMUM OUTPUT POWER: 23 mW
WAVELENGTH: 778 – 787 nm

Additional Laser Caution

1. Laser Interlock Mechanism
   The position of the switch (S601) for detecting loading state is detected by the system microprocessor, and the design prevents laser diode oscillation when the switch (S601) is not on $\overline{\text{CLMP}}$ terminal side ($\overline{\text{CLMP}}$ signal is OFF or high level.). Thus, the interlock will no longer function if the switch (S601) is deliberately set to $\overline{\text{CLMP}}$ terminal side (low level).
   The interlock also does not function in the test mode *.
   Laser diode oscillation will continue, if pin 1 of M51593FP (IC101) on the PRE-AMP BOARD ASSY mounted on the pickup assembly is connected to GND, or pin 19 is connected to low level (ON), or else the terminals of Q101 are shorted to each other (fault condition).

2. When the cover is opened with the servo mechanism block removed and turned over, close viewing of the objective lens with the naked eye will cause exposure to a Class 1 laser beam.

* Refer to page 53.

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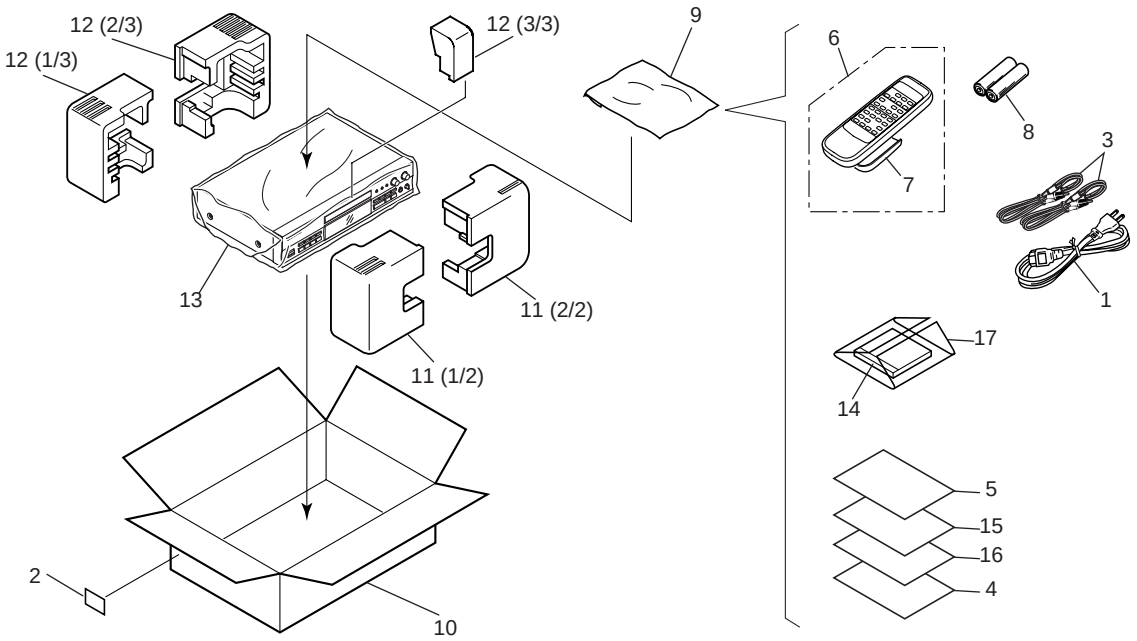
2. EXPLODED VIEWS AND PARTS LIST

NOTES: ● *Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.*
● *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
● *Screws adjacent to ▼ mark on the product are used for disassembly.*

2.1 PACKING



(1) PACKING PARTS LIST

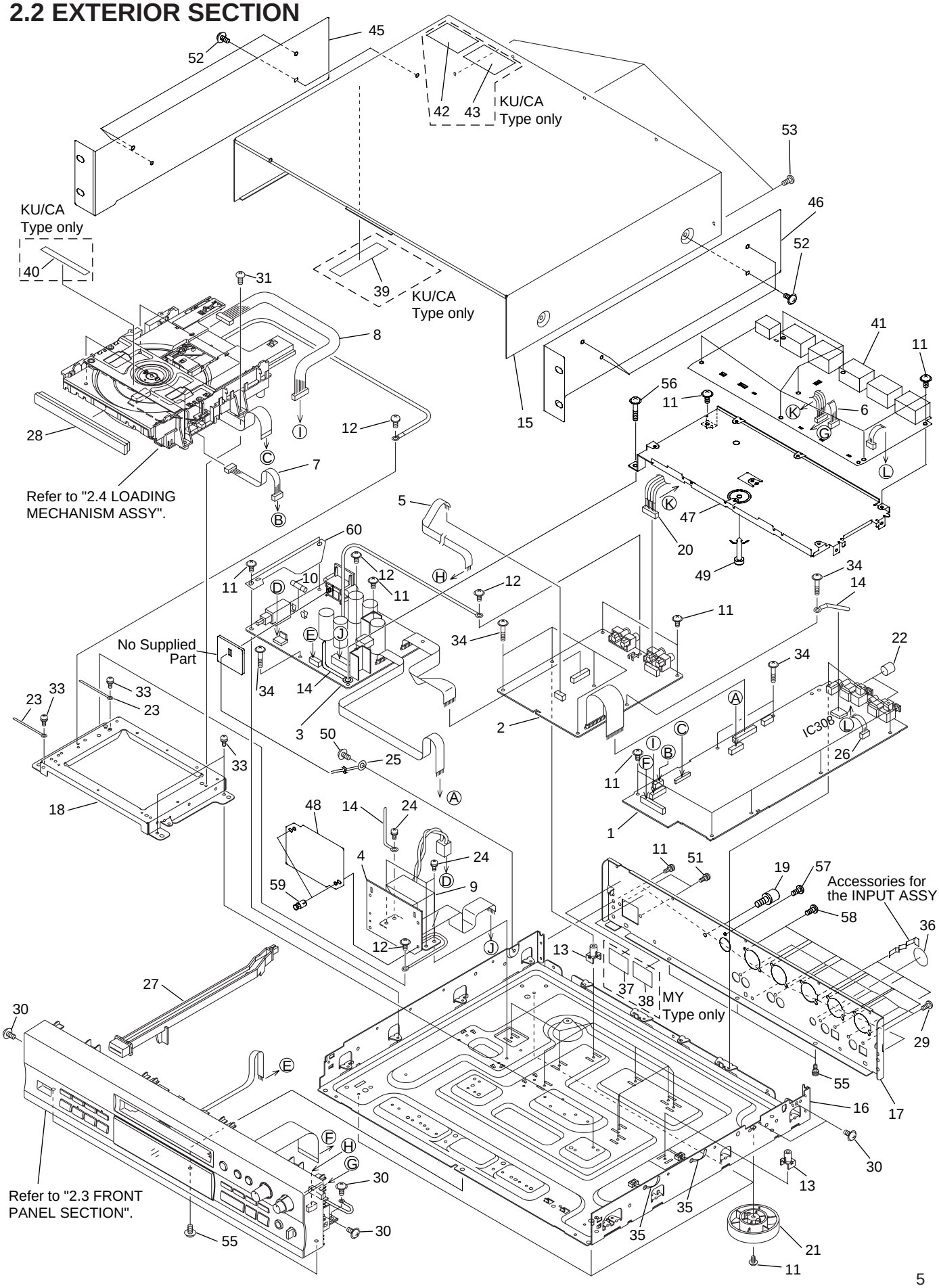
Mark	No.	Description	Part No.
⚠	1	AC Power Cord	See Contrast table (2)
	2	Bar Code Label MY	See Contrast table (2)
	3	Audio Cable (L=1.2m)	PDE1003
	4	Operating Instructions (English/French/Spanish)	PRE1282
	5	Caution	PRM1045
	6	Remote Control Unit (R-800)	PWW1122
	7	Battery Cover	PZN1010
NSP	8	Dry Cell Battery (R03,AAA)	VEM-022
	9	Polyethylene Bag	RHL1024
	10	Packing Case	PHG2365
	11	Protector (F)	PHA1341
	12	Protector (R)	PHA1342
	13	Seat	RHX1006
NSP	14	CDR Disc	PEX1007
NSP	15	Registration Card	See Contrast table (2)
NSP	16	Brochure	PEX1009
	17	Polystylene cover	PHL1067

(2) CONTRAST TABLE

CDR-850/MY and KU/CA are constructed the same except for the following :

Mark	No.	Symbol and Description	Part No.		Remarks
			CDR-850/MY	CDR-850/KU/CA	
⚠	1	AC Power Cord	DDG1072	DDG1028	
	2	Bar Code Label MY	PRW1531	Not used	
	2	Bar Code Label KU	Not used	PRW1530	
NSP	15	Registration Card	PEX1010	PEX1008	

2.2 EXTERIOR SECTION



(1) EXTERIOR SECTION PARTS LIST

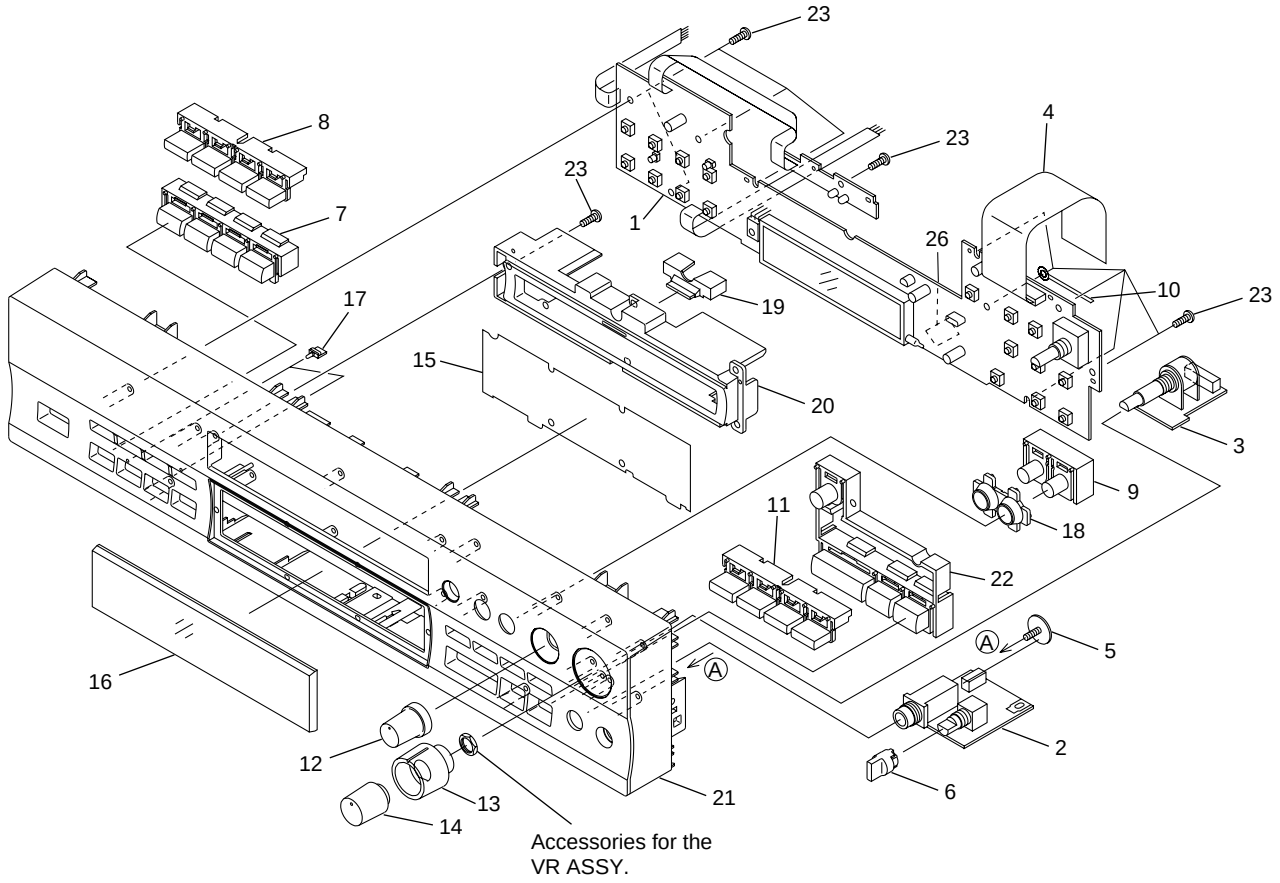
Mark	No.	Description	Part No.
NSP⚠	1	SERVO DIGITAL Assy	See Contrast table (2)
	2	AUDIO Assy	See Contrast table (2)
⚠	3	POWER Assy	See Contrast table (2)
NSP	4	TRANS Assy	PWZ3752
	5	Jumper Wire (J)	D20PYY0335E
	6	Connector Assy (8P)	PDE1303
	7	Connector Assy	PG05KK-E10
	8	Connector Assy	PG09KK-E35
⚠	9	Power Transformer	See Contrast table (2)
⚠	10	Fuse (FU1)	See Contrast table (2)
	11	Screw (Steel)	ABA1011
	12	Screw (Steel)	ABA1207
NSP	13	PCB Mould	AMR1525
NSP	14	Cord Stopper	DNF1128
	15	Bonnet	PYY1267
NSP	16	Under Base	PNA2484
	17	Rear Base	See Contrast table (2)
NSP	18	Mecha Base	PNB1591
	19	Terminal Screw	AKE-031
	20	Connector Assy (8P)	PDE1304
	21	Insulator	AMR7198
NSP	22	Cap	VEC1810
	23	Cord Clamper	RNH-184
	24	Screw	RBA1132
NSP	25	Lead Wire Unit	PDF1195
	26	Connector Assy	PF03PP-C16
	27	Power Button	PAC1918
	28	Tray Panel	PNW2902
	29	Screw	BBZ30P080FCC
	30	Screw	IBZ30P060FCC
	31	Screw	BBZ30P100FCC
	32	• • • • •	
	33	Screw	PBA1112
	34	Screw	IBZ30P180FCC
	35	Binder	PEC-107
	36	Black Label	PRW1470
	37	Caution Label HE	See Contrast table (2)
	38	Caution Label	See Contrast table (2)
	39	65 Label	See Contrast table (2)
NSP	40	Laser Caution Label	See Contrast table (2)
	41	INPUT Assy	See Contrast table (2)
	42	FCC Label	See Contrast table (2)
	43	DOC Label	See Contrast table (2)
	44	• • • • •	
	45	Rack Angle L	PNB1604
	46	Rack Angle R	PNB1605
NSP	47	I/O Angle	PNB1607
NSP	48	Transformer Cover	PNM1338
NSP	49	Card Spacer	QEC1012
	50	Screw	RBA1128
	51	Screw	BBZ40P080FCC
	52	Screw	BBZ40P140FZK
	53	Screw	IBP30P090FCC
	54	• • • • •	
	55	Screw	IBZ30P080FZK
	56	Screw	IBZ30P200FMC
	57	Screw	PMZ26P040FMC
	58	Screw	PMZ30P060FCC
	59	Rivet	RBM-003
	60	Fuse Cover	PNM1343

(2) CONTRAST TABLE

CDR-850/MY and KU/CA are constructed the same except for the following :

Mark	No.	Symbol and Description	Part No.		Remarks
			CDR-850/MY	CDR-850/KU/CA	
NSP⚠	1	SERVO DIGITAL Assy	PWM2219	PWM2220	
	2	AUDIO Assy	PWZ3933	PWZ3934	
⚠	3	POWER Assy	PWZ3937	PWZ3938	
⚠	9	Power Transformer	PTT1346	PTT1355	
⚠	10	Fuse (FU1 : T500mA)	AEK1051	Not used	
⚠	10	Fuse (FU1 : 1A)	Not used	REK1075	
	17	Rear Base	PNA2488	PNA2482	
	37	Caution Label HE	PRW1233	Not used	
	38	Caution Label	VRW1094	Not used	
	39	65 Label	Not used	ARW7050	
NSP	40	Laser Caution Label	Not used	PRW1516	
	41	INPUT Assy	PWZ3929	PWZ3930	
	42	FCC Label	Not used	VRW1725	
	43	DOC Label	Not used	VRW1726	

2.3 FRONT PANEL SECTION

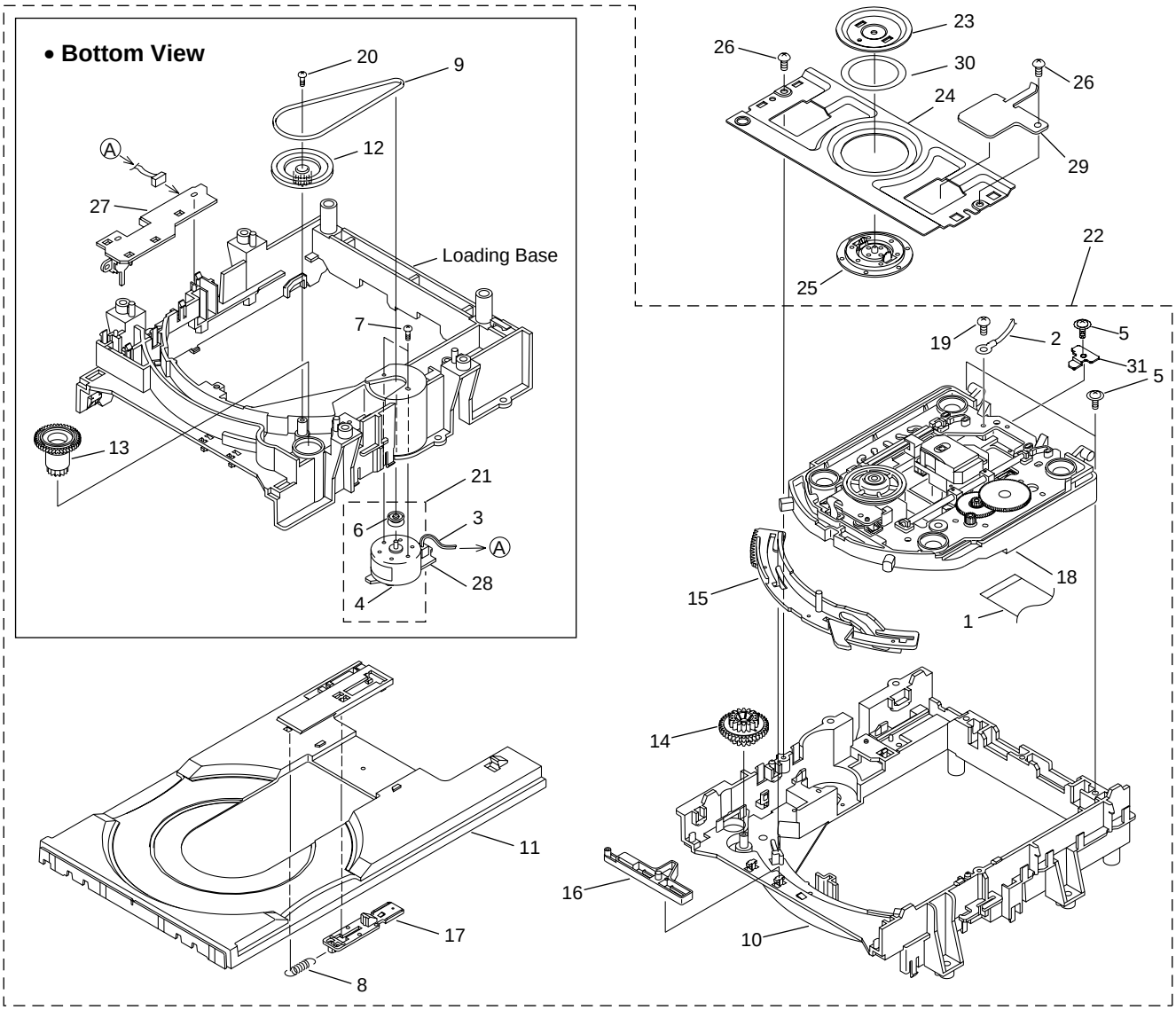


● FRONT PANEL SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	FUNCTION Assy	PYY1266
NSP	2	HEADPHONE Assy	PWZ3715
NSP	3	VR Assy	PWZ3719
	4	22P F•F•C/60V	PDD1190
	5	Screw With Washer	ABA1005
	6	HP Knob H	PAC1944
	7	Mode Button H	PAC1945
	8	Manual Button H(L)	PAC1946
	9	REC Button H	PAC1948
	10	Cord Clamper	RNH-184
	11	Manual Button H(R)	PAC1947
	12	VOL Knob Assy	PXA1621
	13	REC Knob H L	PAC1942
	14	REC Knob H R	PAC1943
	15	FL Sheet	PAM1762

Mark	No.	Description	Part No.
	16	Display Window H	PAM1794
	17	LED Lens	PNW2745
	18	REC Ring	PNW2795
	19	Lens	PNW2796
	20	Sub Panel	PNW2797
	21	Front Panel H	PNW2903
	22	Play Button H	PAC1950
	23	Screw	PPZ30P100FMC
	24	• • • • •	
	25	• • • • •	
	26	IC (EEPROM)	PYY1250

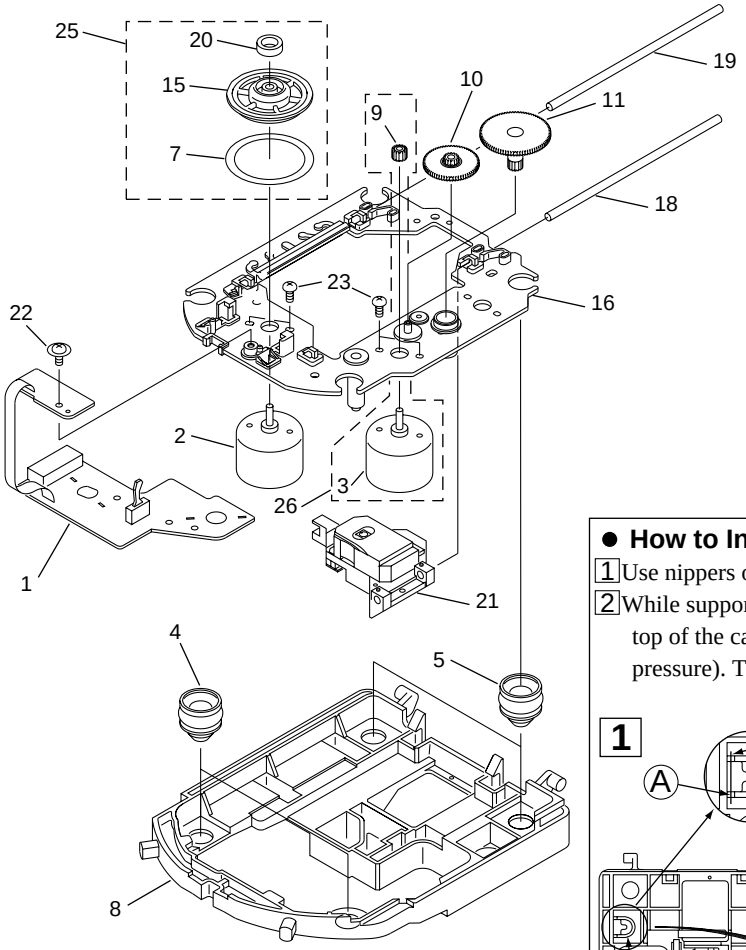
2.4 LOADING MECHANISM ASSY

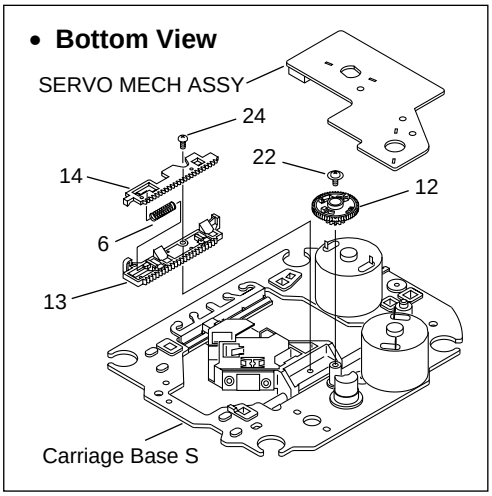


● LOADING MECHANISM ASSY PARTS LIST

Mark	No.	Description	Part No.
	1	32P F•F•C/30V	PDD1187
NSP	2	Earth Lead Unit	PDF1088
	3	Connector Assy	PG02KK-E35
	4	DC Motor	PXM1027
	5	Screw	DBA1006
	6	Motor Pulley	PNW1634
	7	Screw	VBA1055
	8	Tray Stopper Spring	VBH1277
	9	Rubber Belt	VEB1260
	10	Loading Base	VNL1730
	11	Tray	VNL1731
	12	Gear Pulley	VNL1733
	13	Loading Gear	VNL1734
	14	Drive Gear	VNL1735
	15	Drive Cam	VNL1736
	16	Lock Plate	VNL1820
	17	Tray Stopper	VNL1739
NSP	18	CD-RW SERVO MECH Assy	PXA1609
	19	Screw	BBZ26P040FMC
	20	Screw	IPZ20P080FMC
	21	Loading Motor Assy	VXX2505
NSP	22	Loading Mechanism Assy	PXA1608
	23	Clamper Plate	VNE2068
	24	Bridge	VNE2069
	25	Clamper	VNL1738
	26	Screw	IPZ26P060FMC
NSP	27	LOADING A Assy	PWZ3727
NSP	28	LOADING B Assy	PWZ3728
	29	Tray Holder	PNM1341
	30	Spacer	PNM1334
	31	Stopper	DNH2076

2.5 SERVO MECHANISM ASSY

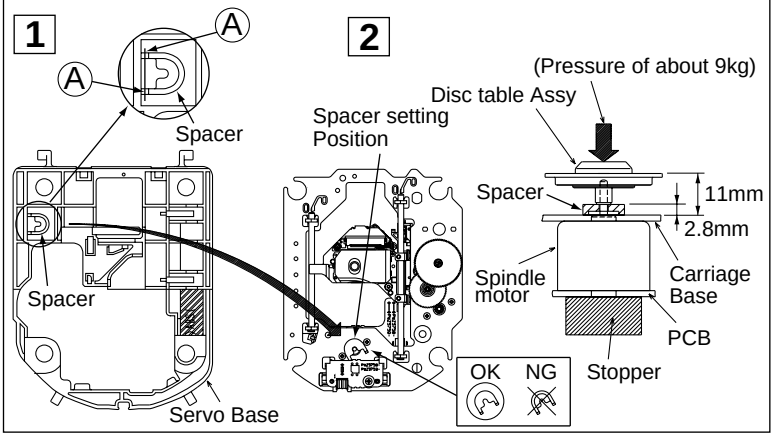




● How to Install the Disc Table

1 Use nippers or other tool to cut the two sections marked Ⓐ in figure 1 .

2 While supporting the spindle motor shaft with the stopper, put spacer on top of the carriage base, and stick the disc table on top (takes about 9kg pressure). Take off the spacer.



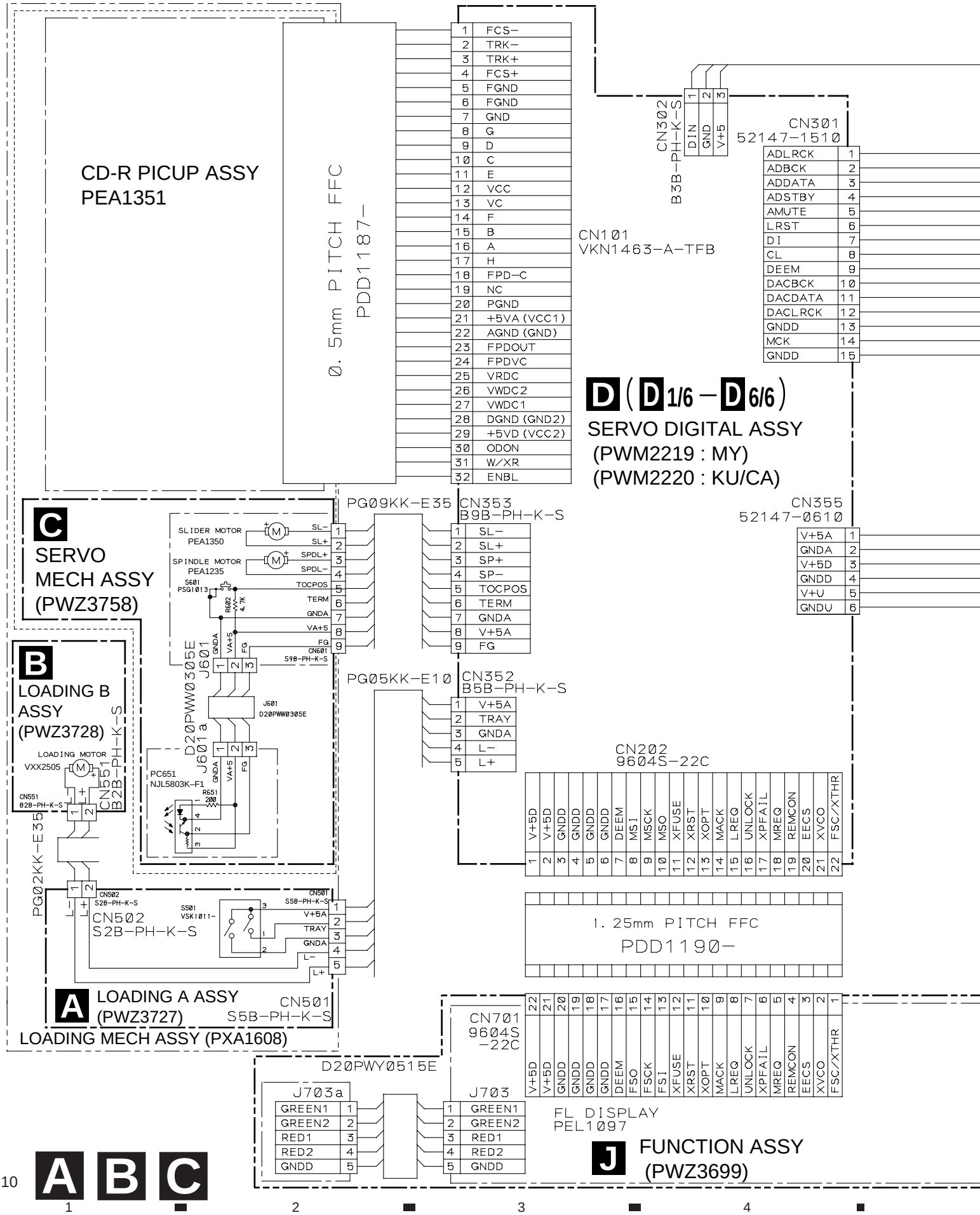
● SERVO MECHANISM ASSY PARTS LIST

Mark	No.	Description	Part No.
NSP	1	SERVO MECH Assy	PWZ3758
	2	D.C.mortor Assy	PEA1235
NSP	3	DC Motor	PXM1042
	4	Float Rubber A	AEB7063
	5	Float Rubber B	AEB7066
NSP	6	Rack Spring	DBH1285
NSP	7	Mirror Sheet	PNM1325
	8	Servo Base	PNW2853
	9	Pinion Gear	PNW2854
	10	Gear A	PNW2855
	11	Gear B	PNW2856
	12	Gear C	PNW2857
	13	Rack	PNW2858
	14	Rack Stopper	PNW2859
NSP	15	Disc Table	PNW2860

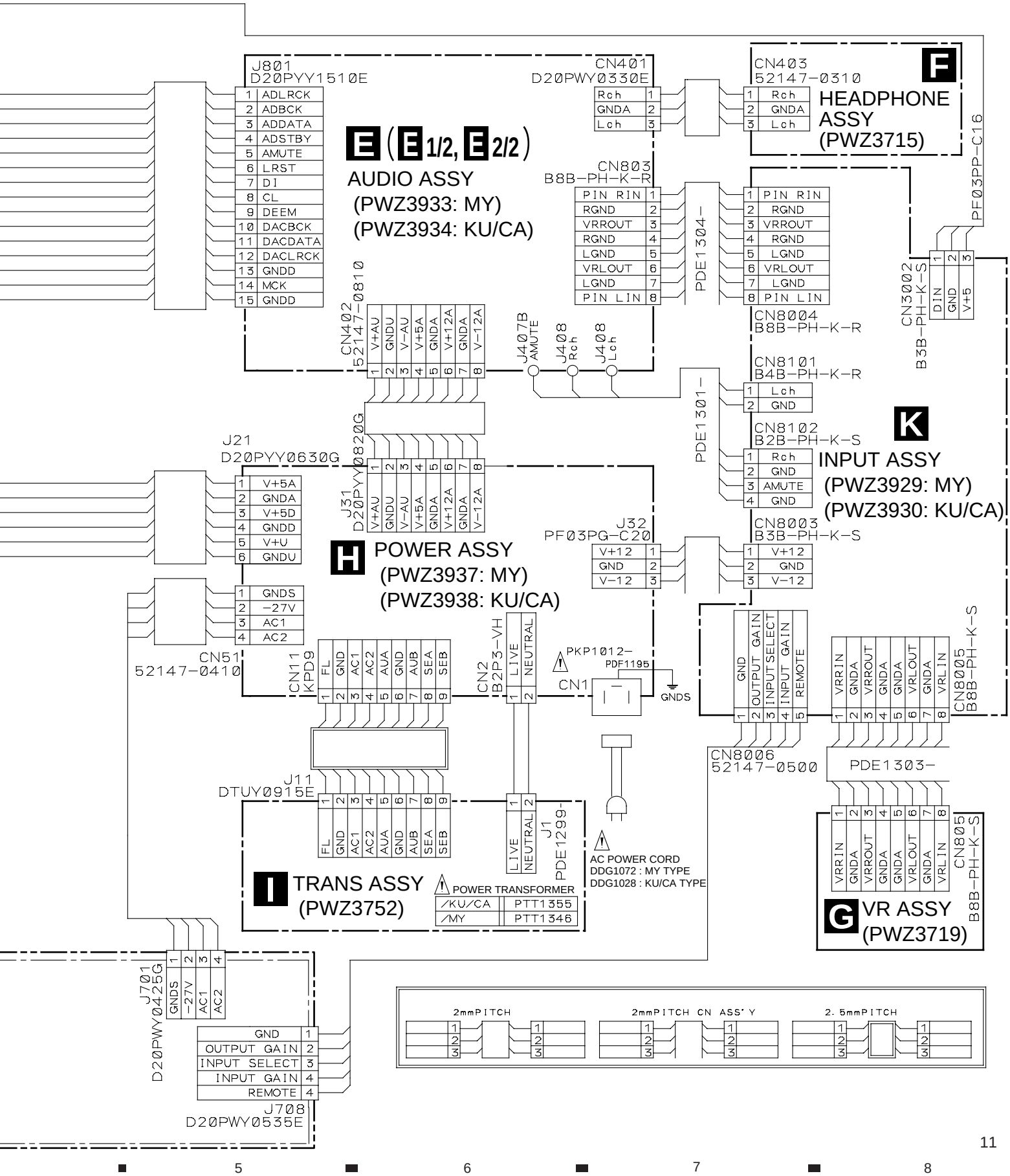
Mark	No.	Description	Part No.
	16	Carriage Base S	PNW2874
	17	• • • • •	
	18	Guide Bar	VLL1488
	19	Sub Guide Bar	VLL1489
NSP	20	Magnet	VYM1024
	21	CD-R Pickup	PEA1351
	22	Screw	IPZ20P060FMC
	23	Screw	PMZ20P030FMC
	24	Screw	JGZ17P030FMC
	25	Disc Table Assy	PEA1349
	26	Carriage Motor Assy	PEA1350

3. SCHEMATIC DIAGRAM

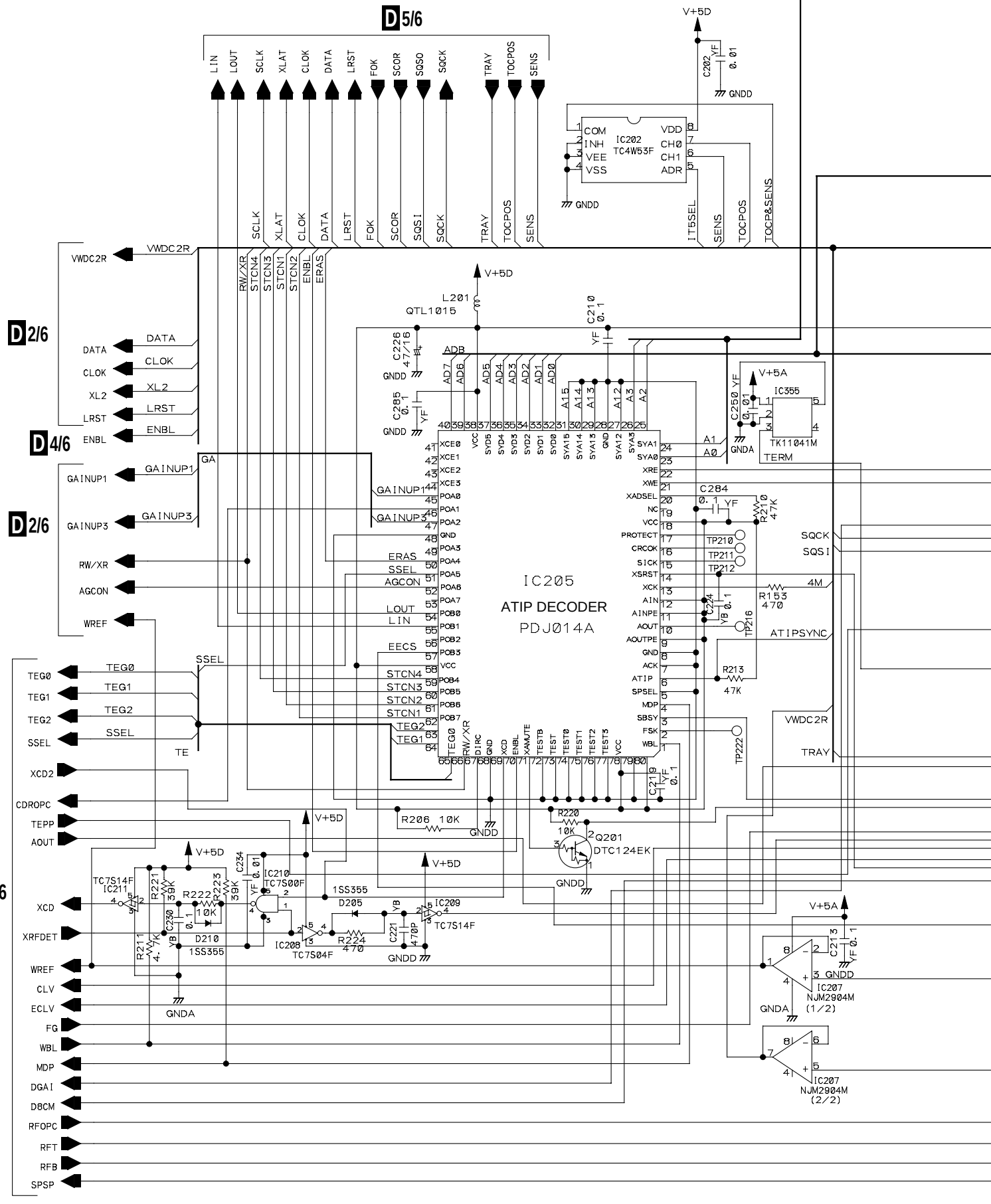
3.1 OVERALL CONNECTIONS, LOADING A, B, and SERVO MECH ASSEMBLIES



Note : When ordering service parts, be sure to refer to "EXPLODED VIEWS and PARTS LIST" or "PCB PARTS LIST".



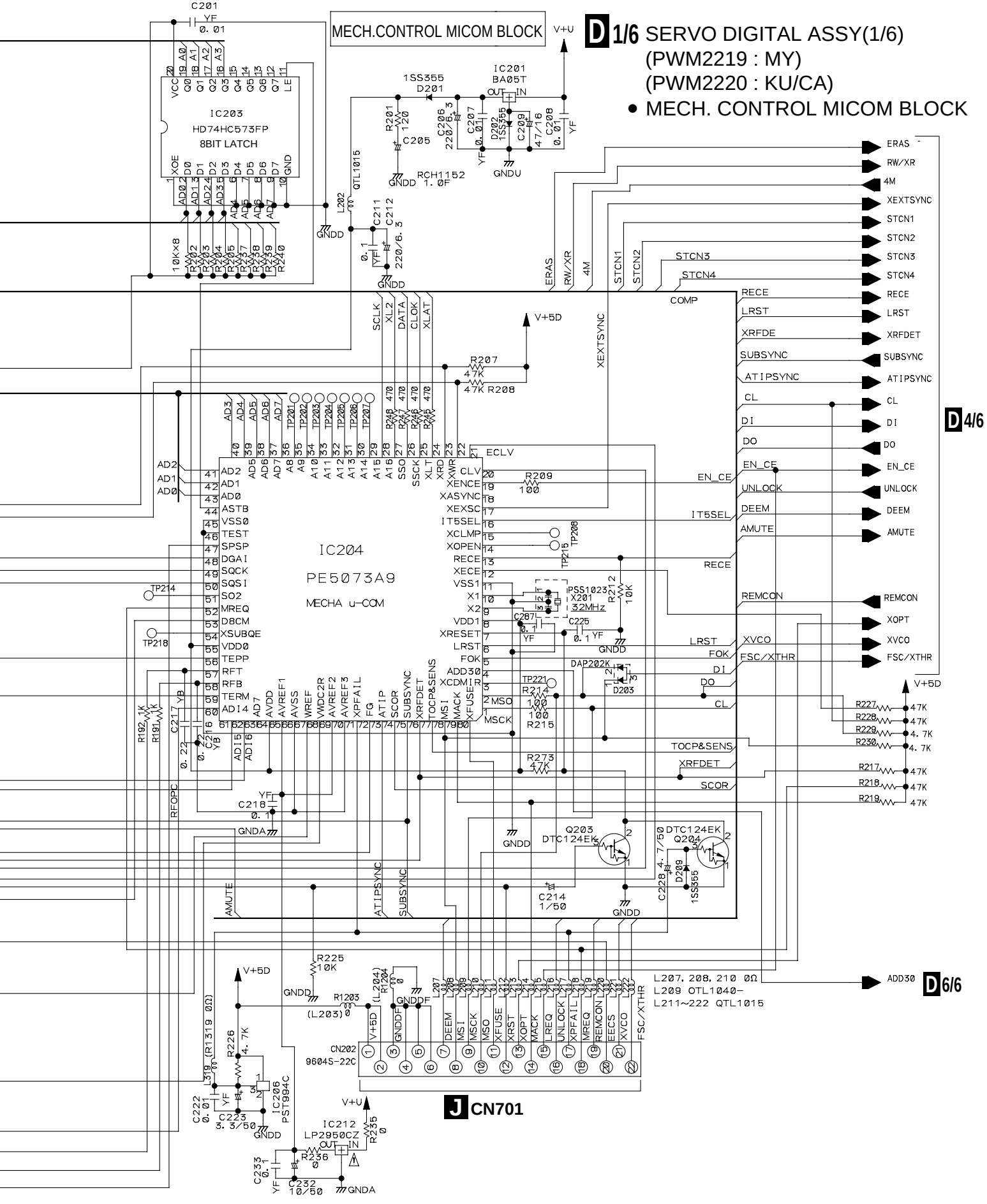
3.2 SERVO DIGITAL ASSY(1/6)



D 1/6 SERVO DIGITAL ASSY(1/6)

(PWM2219 : MY)
(PWM2220 : KU/CA)

- MECH. CONTROL MICOM BLOCK

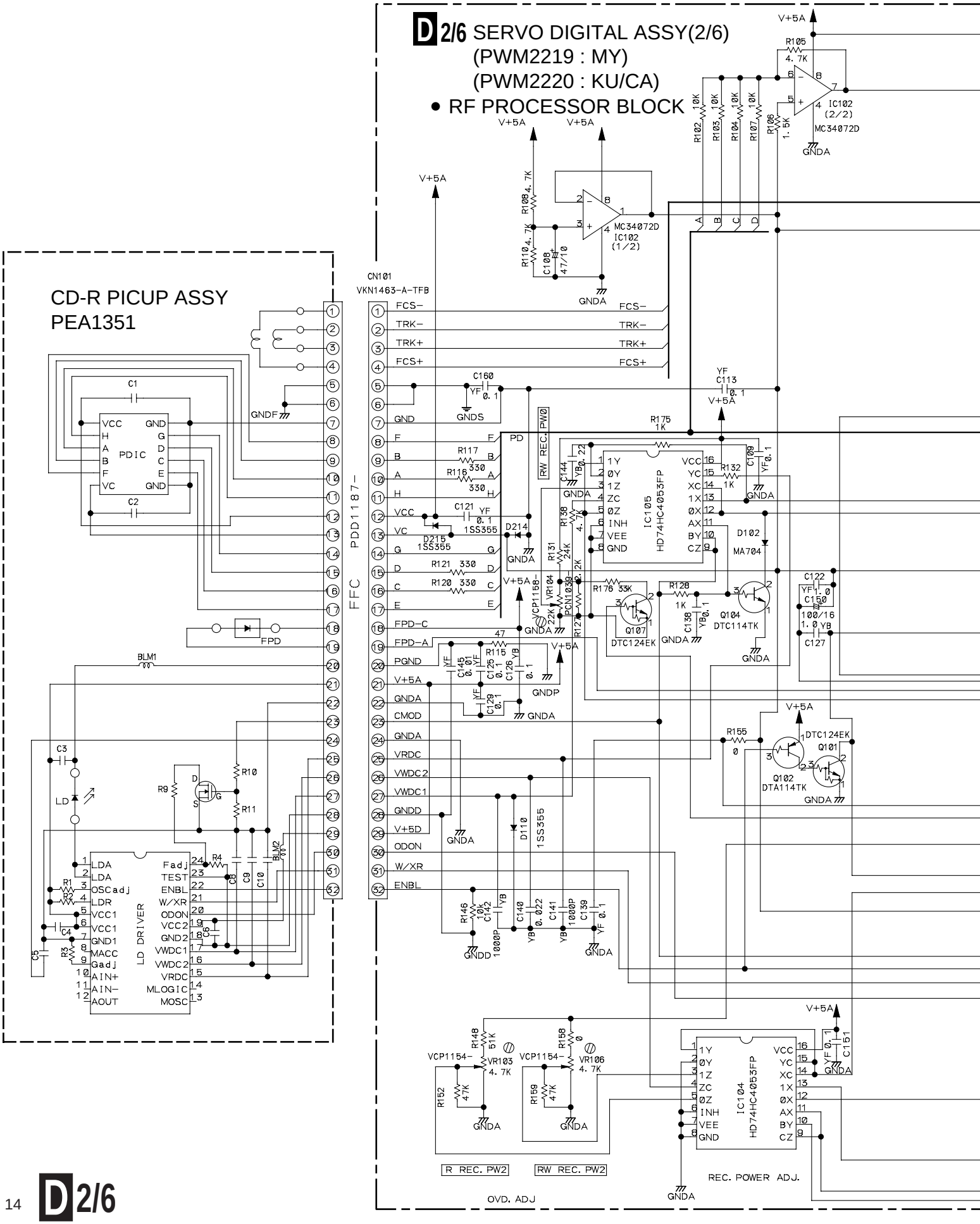


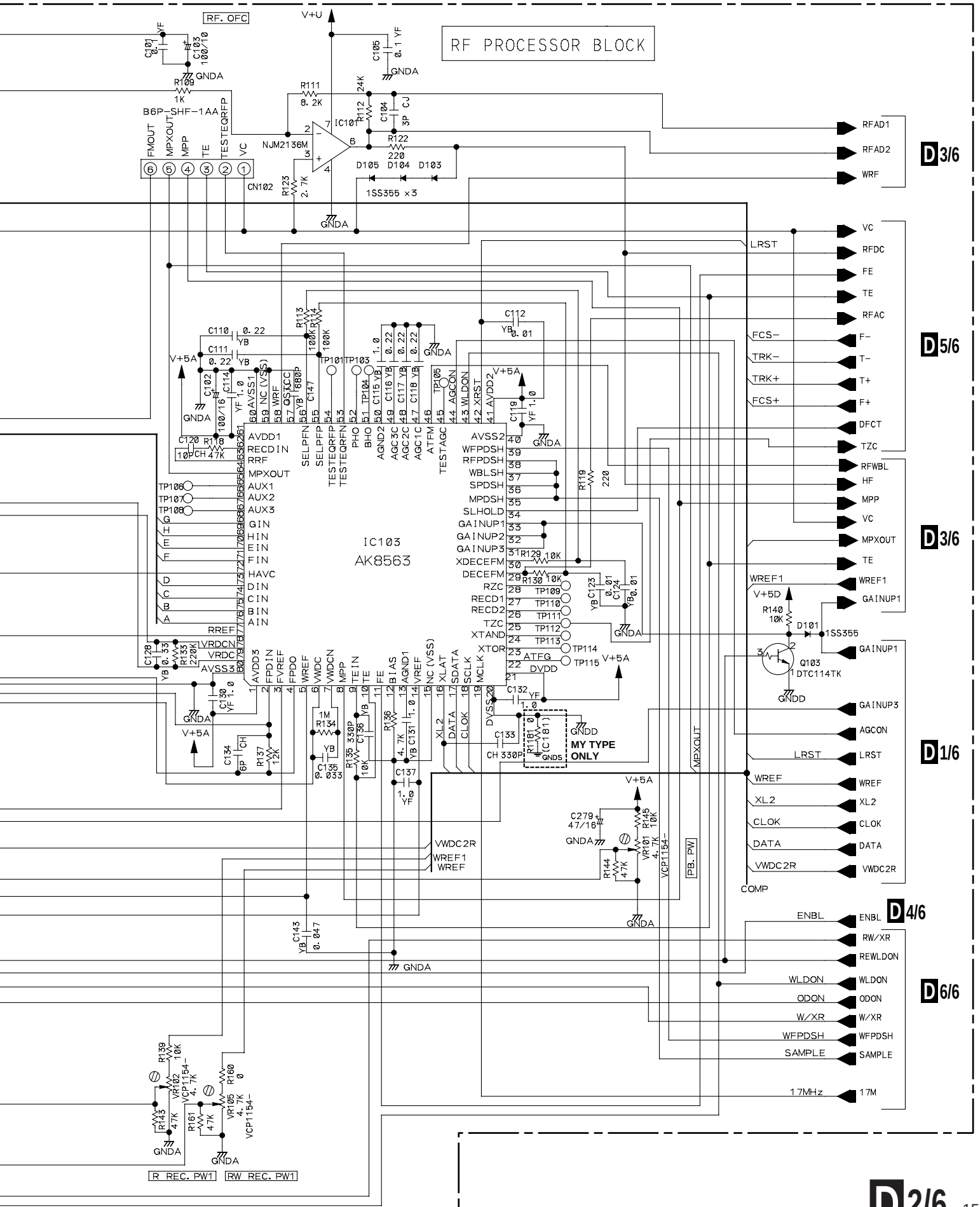
3.3 SERVO DIGITAL(2/6) and PICKUP ASSEMBLIES

D 2/6 SERVO DIGITAL ASSY(2/6)
(PWM2219 : MY)
(PWM2220 : KU/CA)

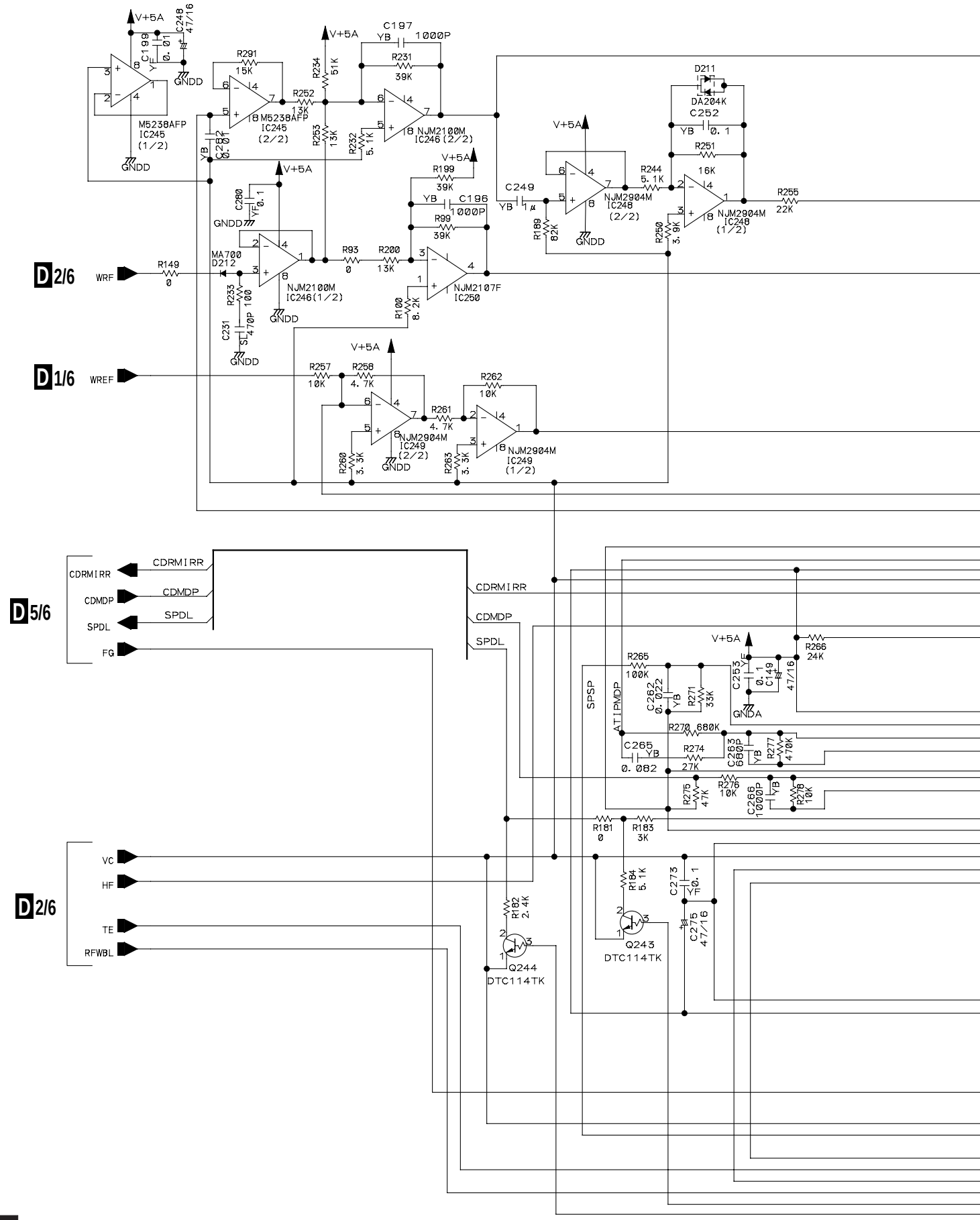
- RF PROCESSOR BLOCK

CD-R PICUP ASSY
PEA1351



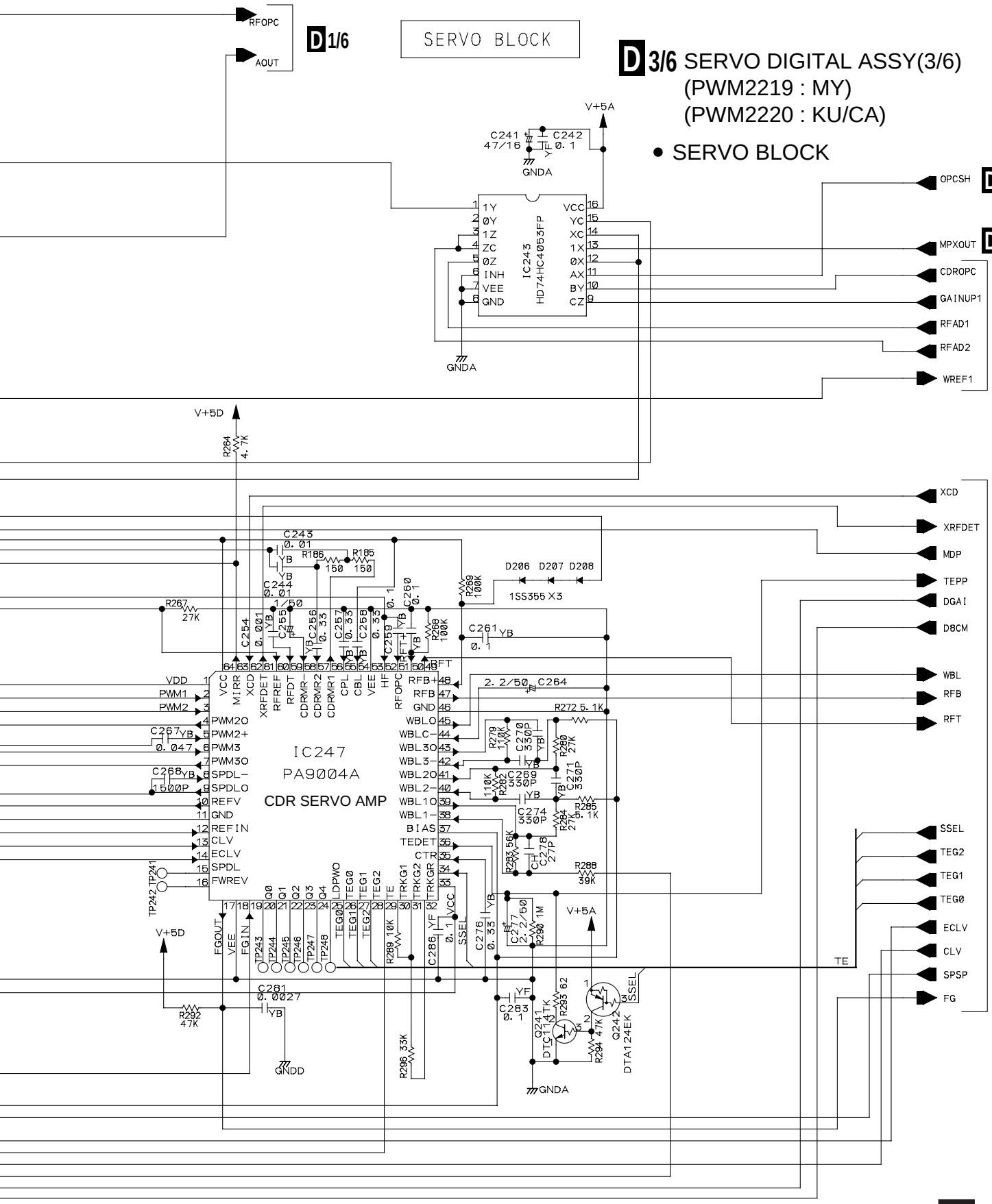

RF PROCESSOR BLOCK
RF. OFC
IC103
AK8563
NJM2136M
IC101
CN102
B6P-SHF-1AA
1SS355 ×3
Q103
DTC114TK
D101
1SS355
MY TYPE ONLY
COMP
PB. PW
R_REC. PW1
RW_REC. PW1
RFAD1
RFAD2
WRF
VC
RFDC
FE
TE
RFAC
F-
T-
T+
F+
DFCT
TZC
RFWBL
HF
MPP
MPXOUT
WREF1
GAINUP1
GAINUP3
AGCON
LRST
WREF
XL2
CLOK
DATA
VWDC2R
ENBL
RW/XR
REWLDON
WLDON
ODON
W/XR
WFPDSH
SAMPLE
17M
17MHz
D 3/6
D 5/6
D 3/6
D 1/6
D 4/6
D 6/6
D 2/6

3.4 SERVO DIGITAL ASSY(3/6)

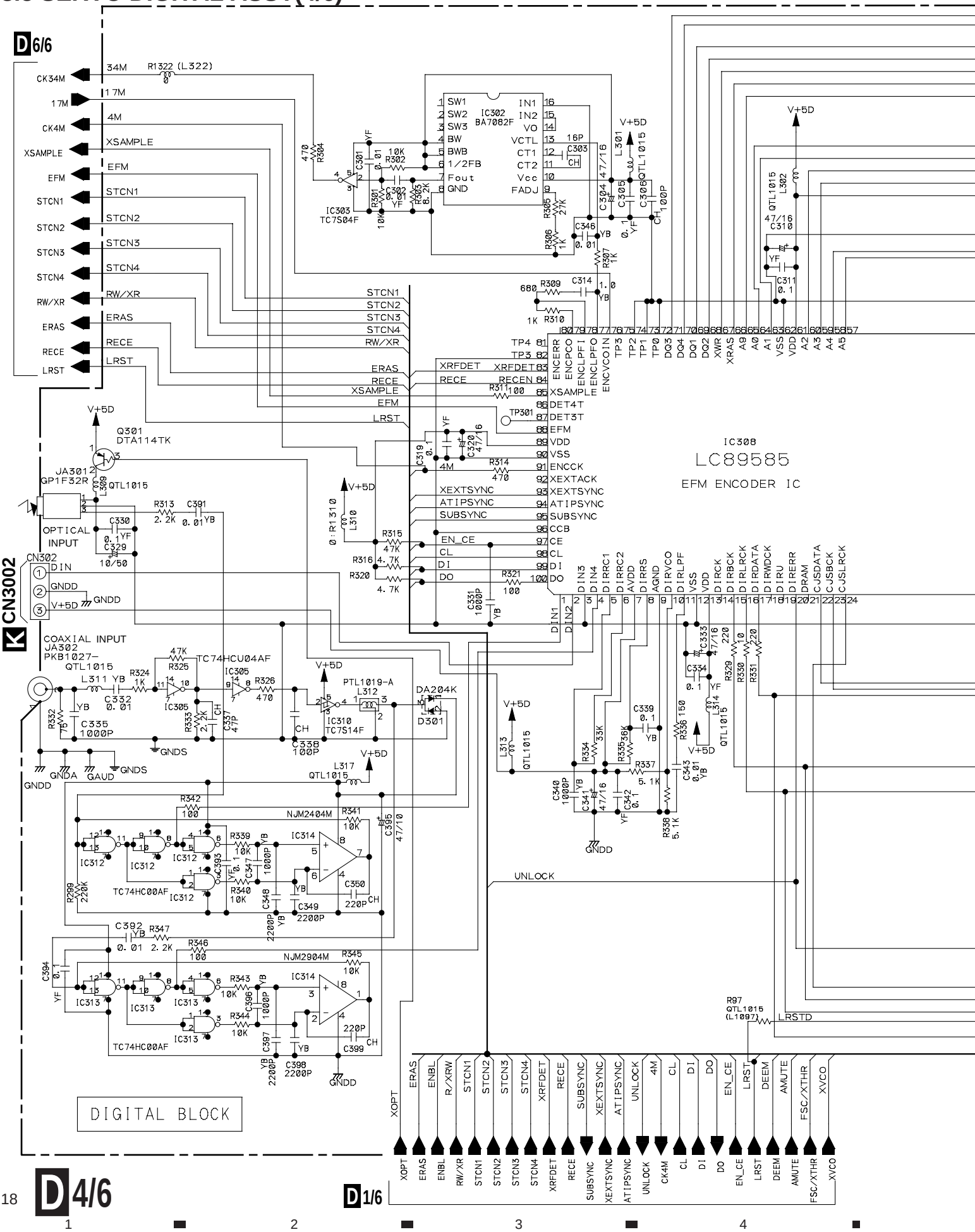


D 3/6 SERVO DIGITAL ASSY(3/6)
(PWM2219 : MY)
(PWM2220 : KU/CA)

- SERVO BLOCK



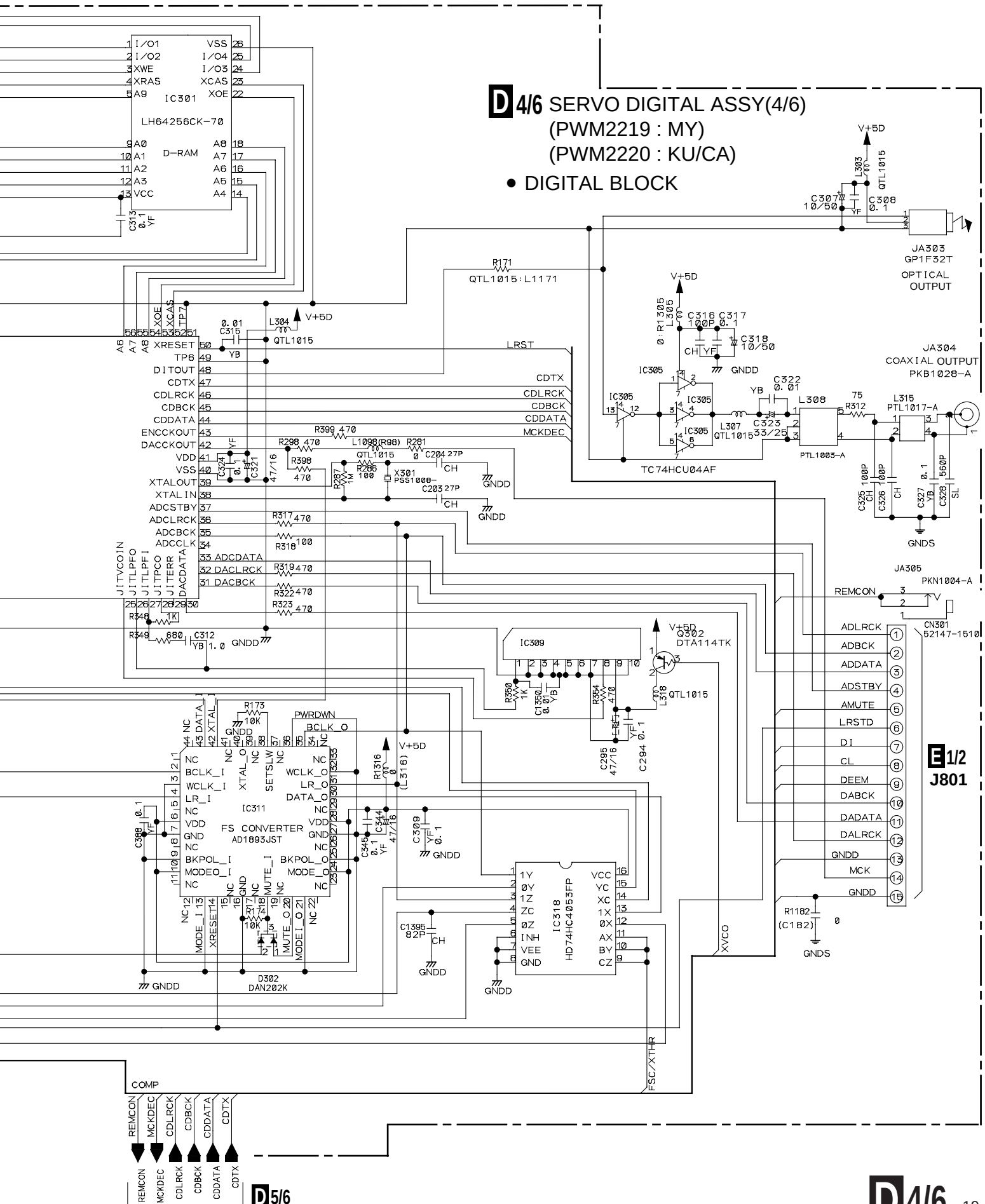
3.5 SERVO DIGITAL ASSY(4/6)



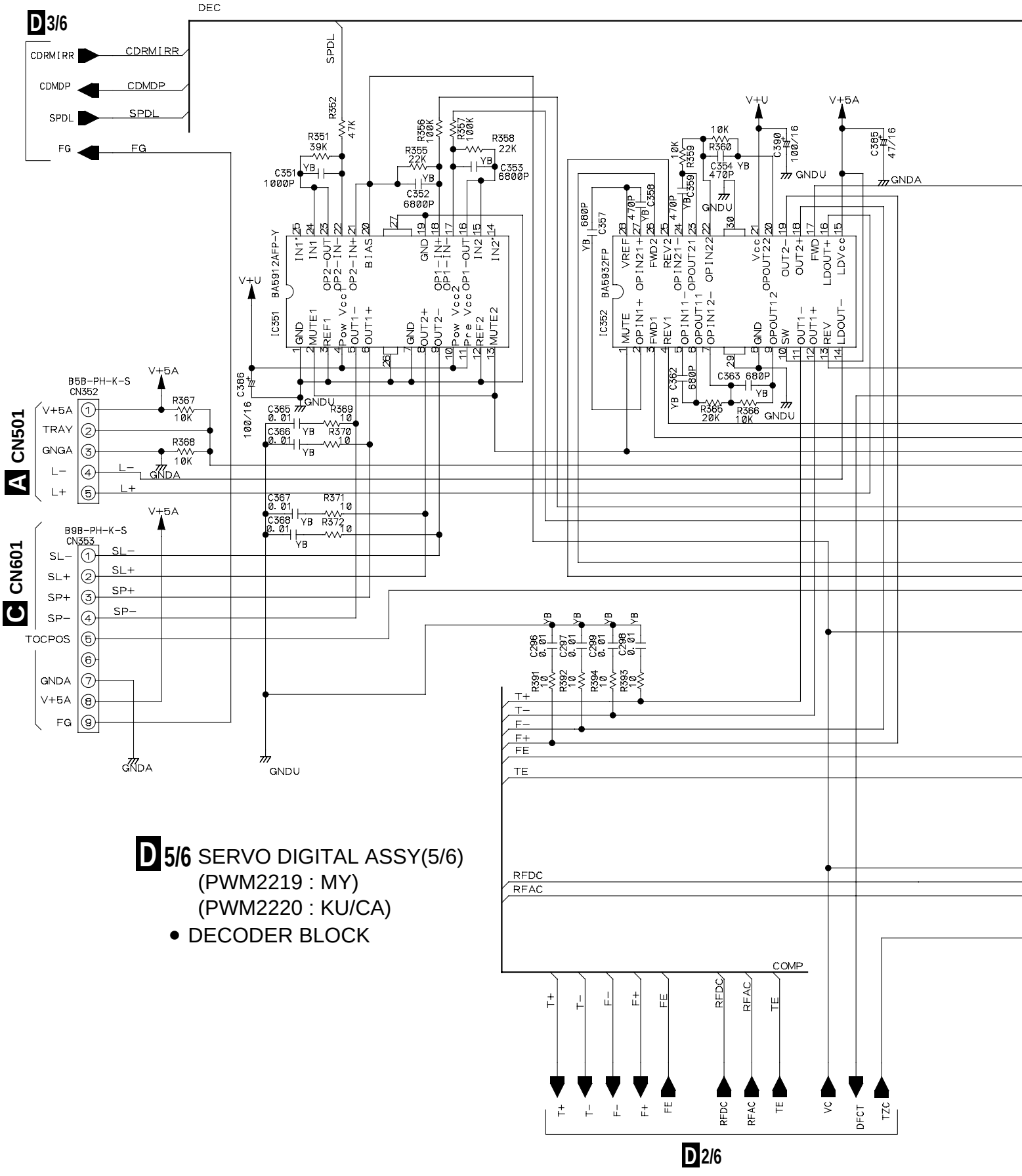
D 4/6 SERVO DIGITAL ASSY(4/6)

(PWM2219 : MY)
(PWM2220 : KU/CA)

- DIGITAL BLOCK

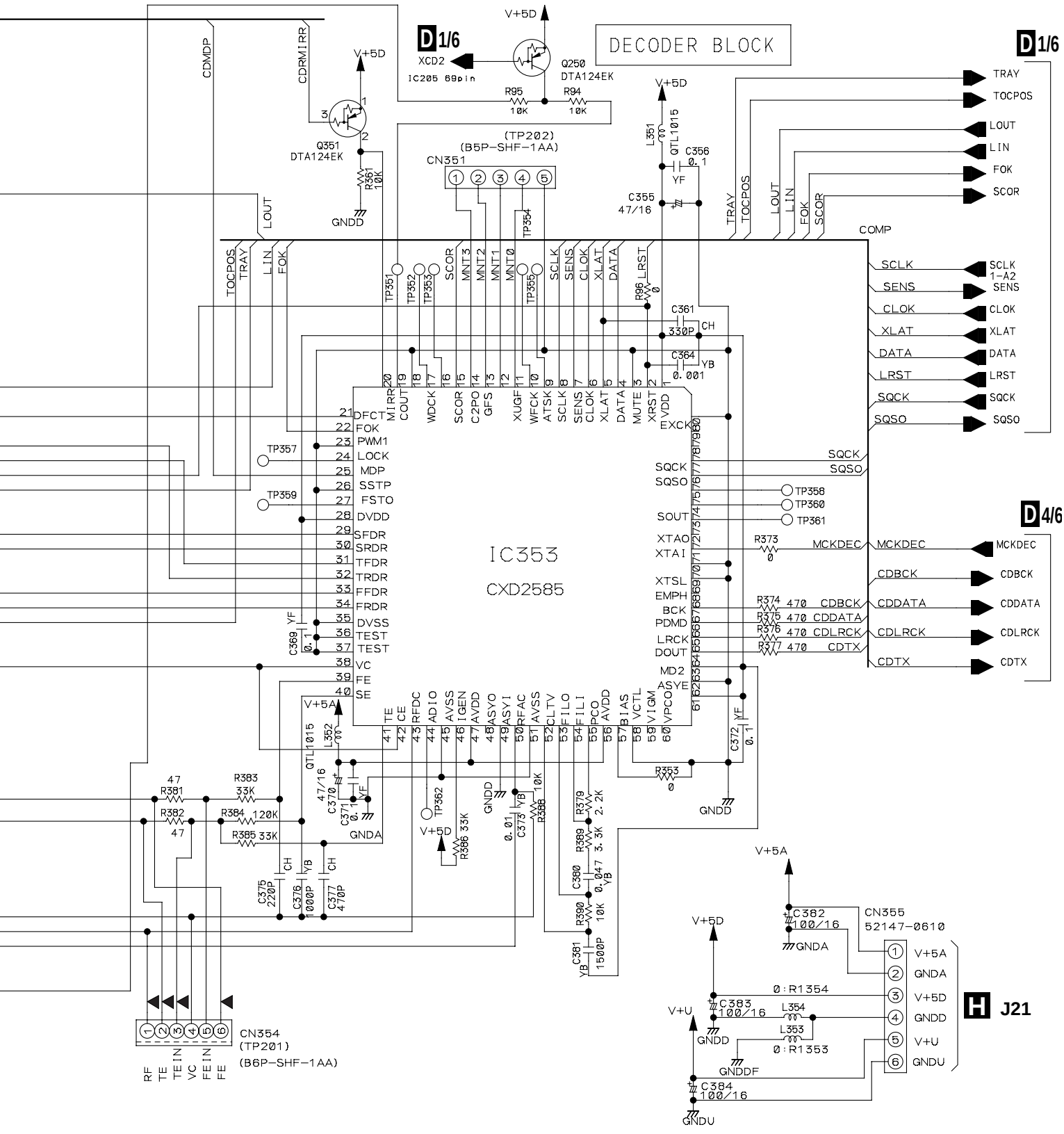


3.6 SERVO DIGITAL ASSY(5/6)

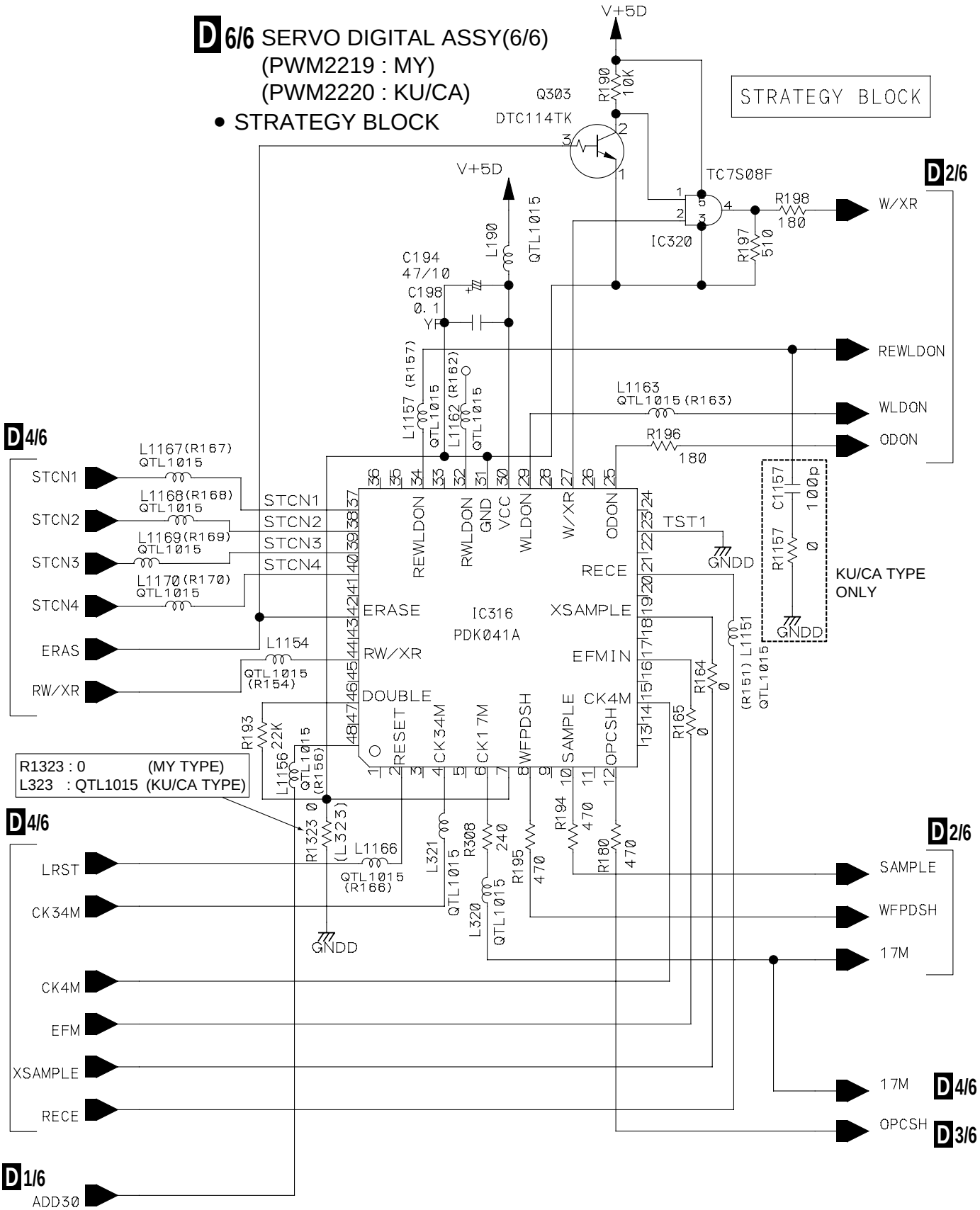


D 5/6 SERVO DIGITAL ASSY(5/6)
(PWM2219 : MY)
(PWM2220 : KU/CA)

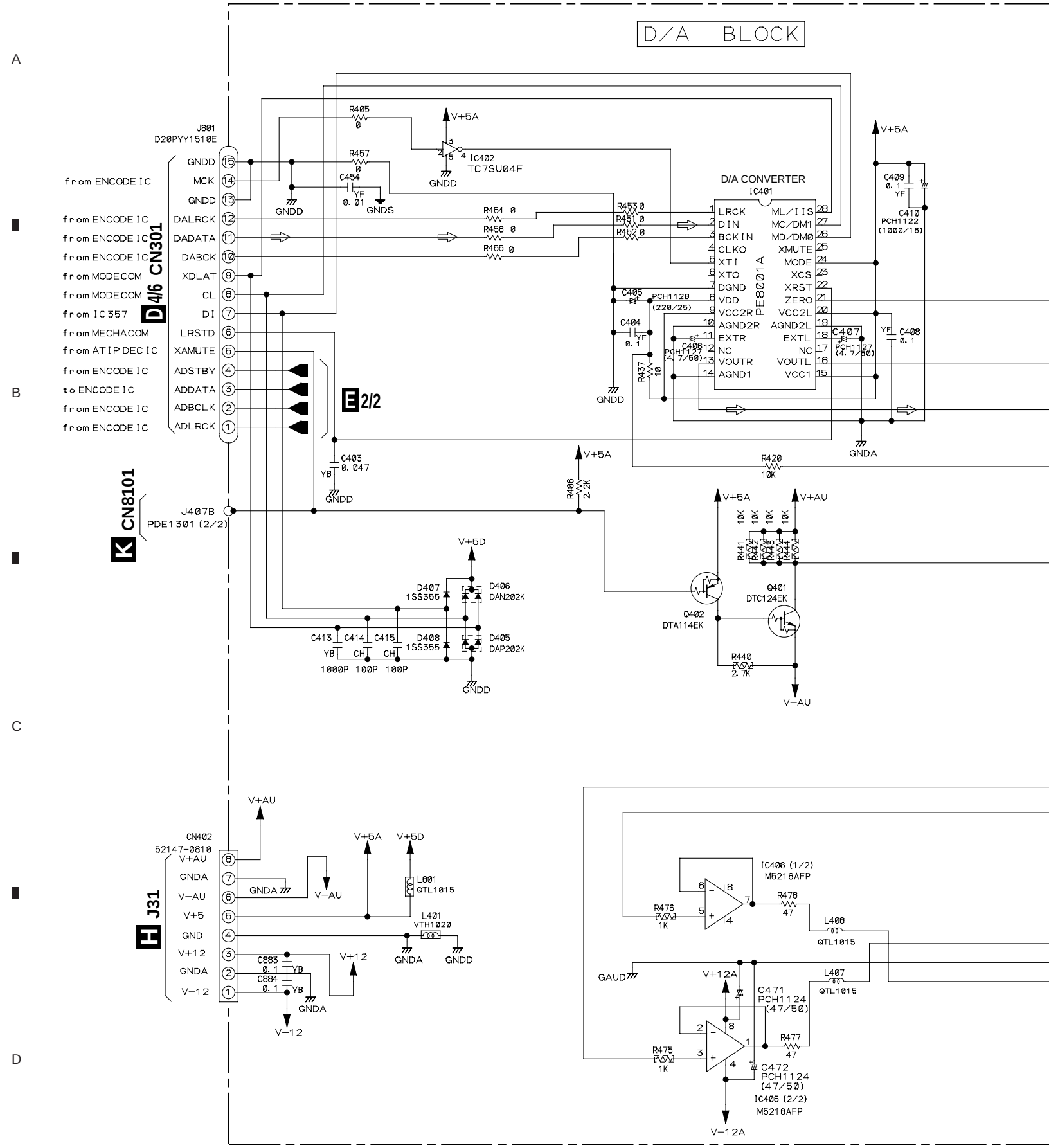
- DECODER BLOCK


DECODER BLOCK
D 1/6
XCD2
IC205 69pin
Q250
DTA124EK
R95 10K
R94 10K
V+5D
CDMDP
CDRMIRR
Q351
DTA124EK
R361 10K
GNDD
(TP202)
(B5P-SHF-1AA)
CN351
TP354
L351 00
QTL1015
C356 0.1 YF
C355 47/16
LOUT
TOCPOS
TRAY
LIN
FOK
SCOR
COMP
TP351
TP352
TP353
MNT3
MNT2
MNT1
MNT0
TP355
SCLK
SENS
CLOK
XLAT
DATA
LRST
R96 0
C361 330P CH
C364 0.001 YB
SQCK
SQSO
SCLK 1-A2
CLOK
XLAT
DATA
LRST
IC353
CXD2585
DFCT
FOK
PWM1
LOCK
MDP
SSTP
FSTO
DVDD
SFDR
SRDR
TFDR
TRDR
FFDR
FRDR
DVSS
TEST
TEST
VC
FE
SE
TP357
TP359
TP358
TP360
TP361
SOUT
XTAO
XTAI
XTSL
EMPH
BCK
PDMD
LRCK
DOUT
MD2
ASYE
R373 0
MCKDEC
CDBCK
CDDATA
CDLRCK
CDTX
R374 470
R375 470
R376 470
R377 470
D 4/6
C369 0.1 YF
L352 00 QTL1015
C370 47/16
C371 0.1 YF
R381 47
R382 47
R383 33K
R384 120K
R385 33K
GNDA
V+5A
TP362
R386 33K
C373 0.01 YB
R388 10K
R379 2.2K
R389 3.3K
C380 0.047 YB
R390 10K
C381 1500P YB
R353 0
C372 0.1 YF
GNDD
C375 220P CH
C376 1000P YB
C377 470P CH
CN354
(TP201)
(B6P-SHF-1AA)
RF
TE
TE IN
VC
FE IN
FE
C382 100/16
CN355
52147-0610
C383 100/16
L354 0:R1354
L353 0:R1353
C384 100/16
GNDDF
GNDU
V+U
H J21

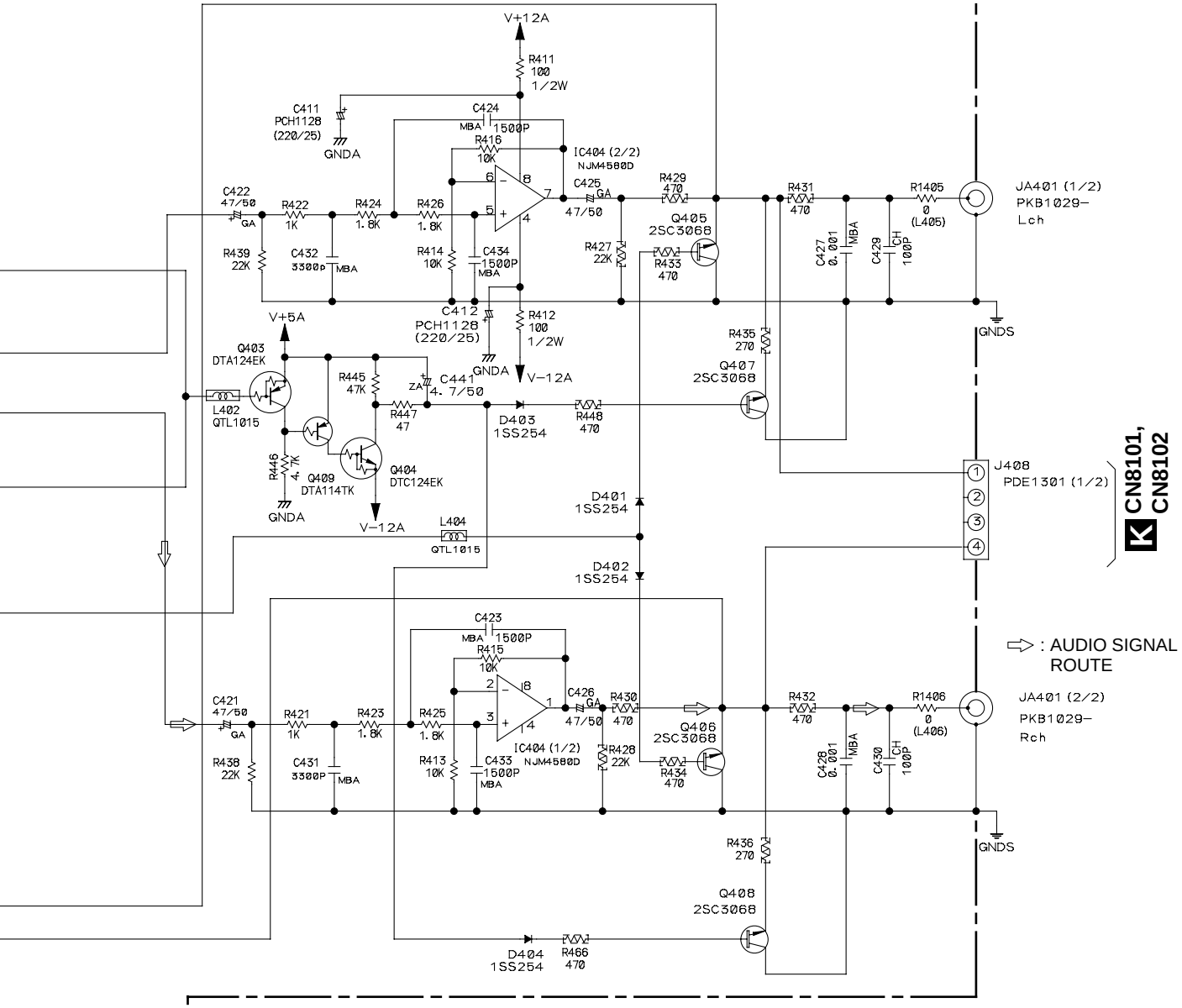
3.7 SERVO DIGITAL ASSY(6/6)

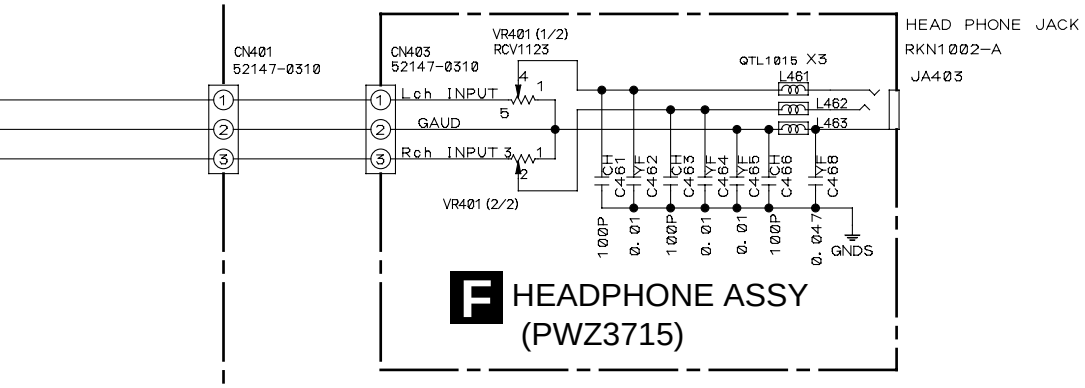


3.8 AUDIO(1/2) and HEADPHONE ASSEMBLIES



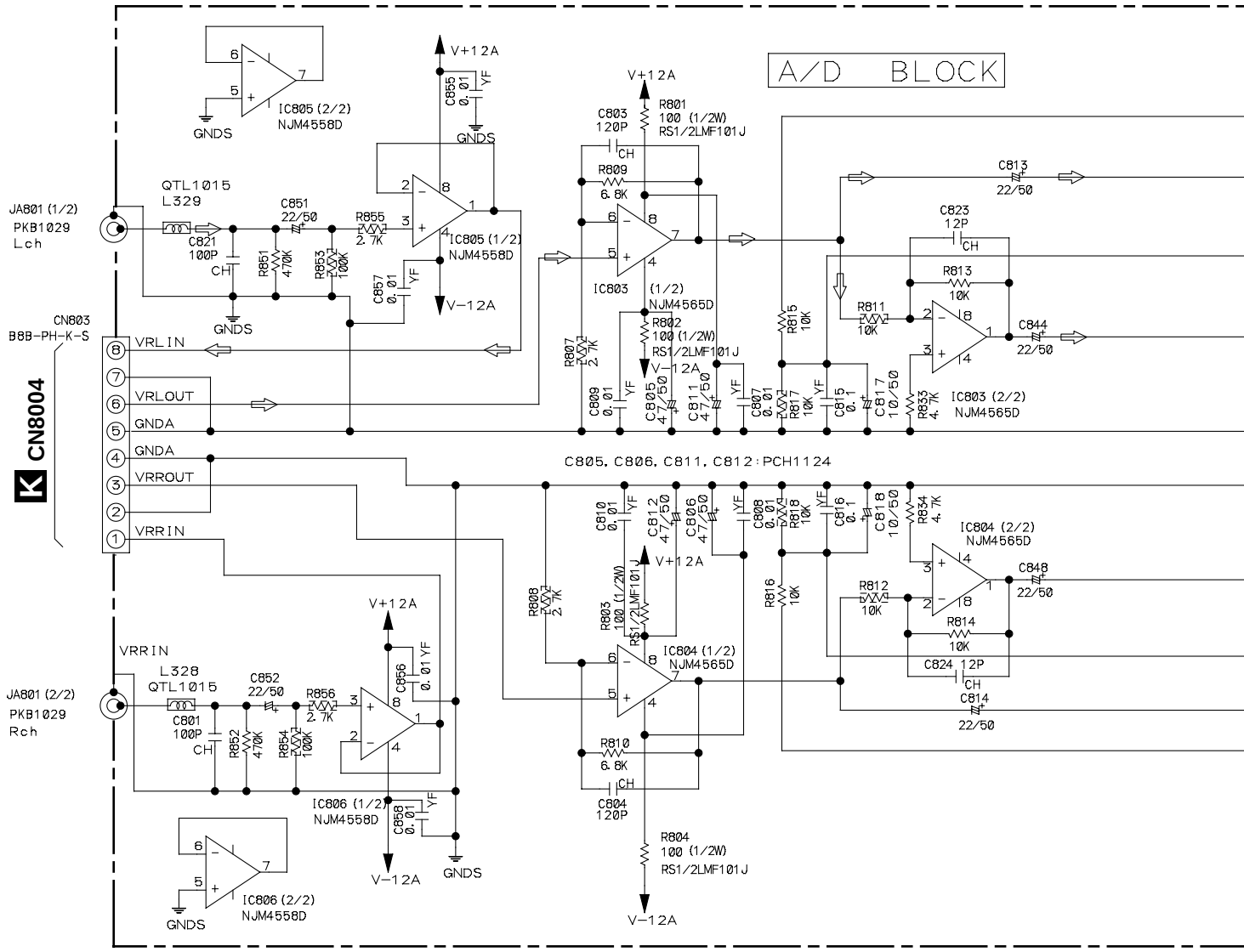
E 1/2 AUDIO ASSY(1/2) • D/A BLOCK
(PWZ3933 : MY)
(PWZ3934 : KU/CA)

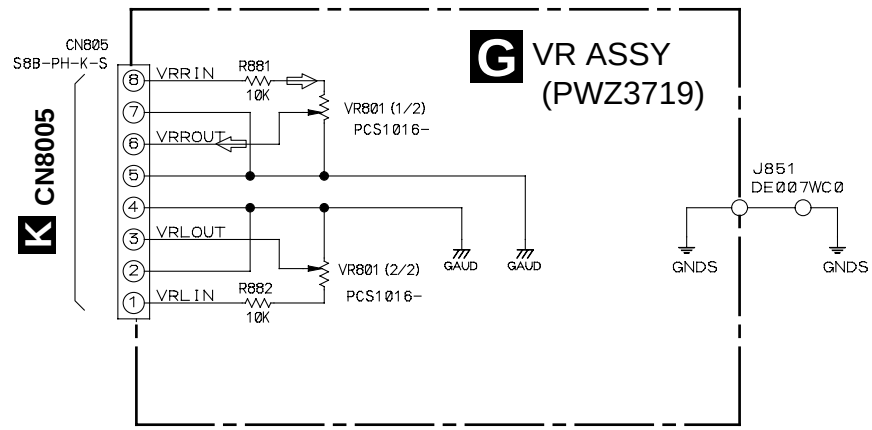


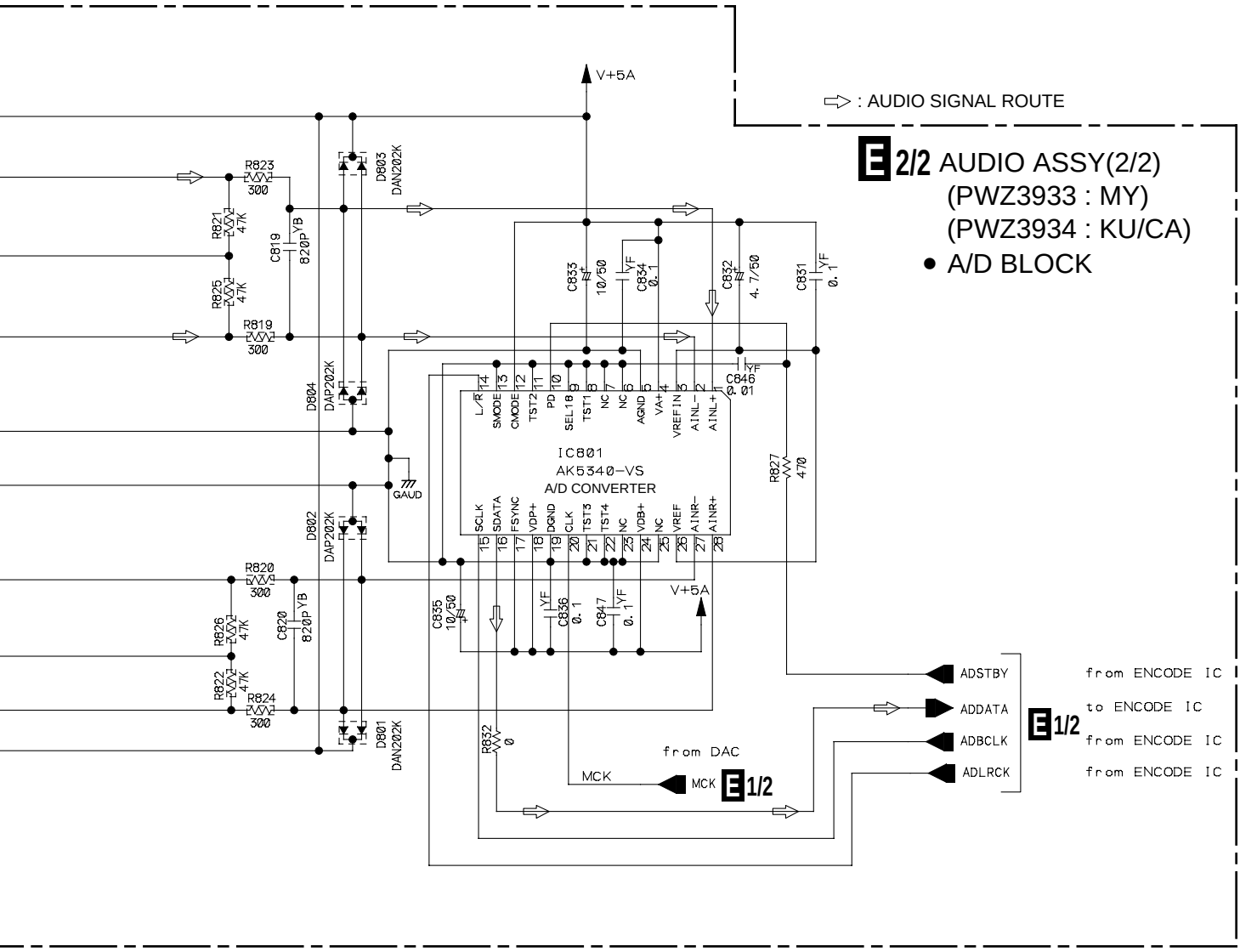


F HEADPHONE ASSY
(PWZ3715)

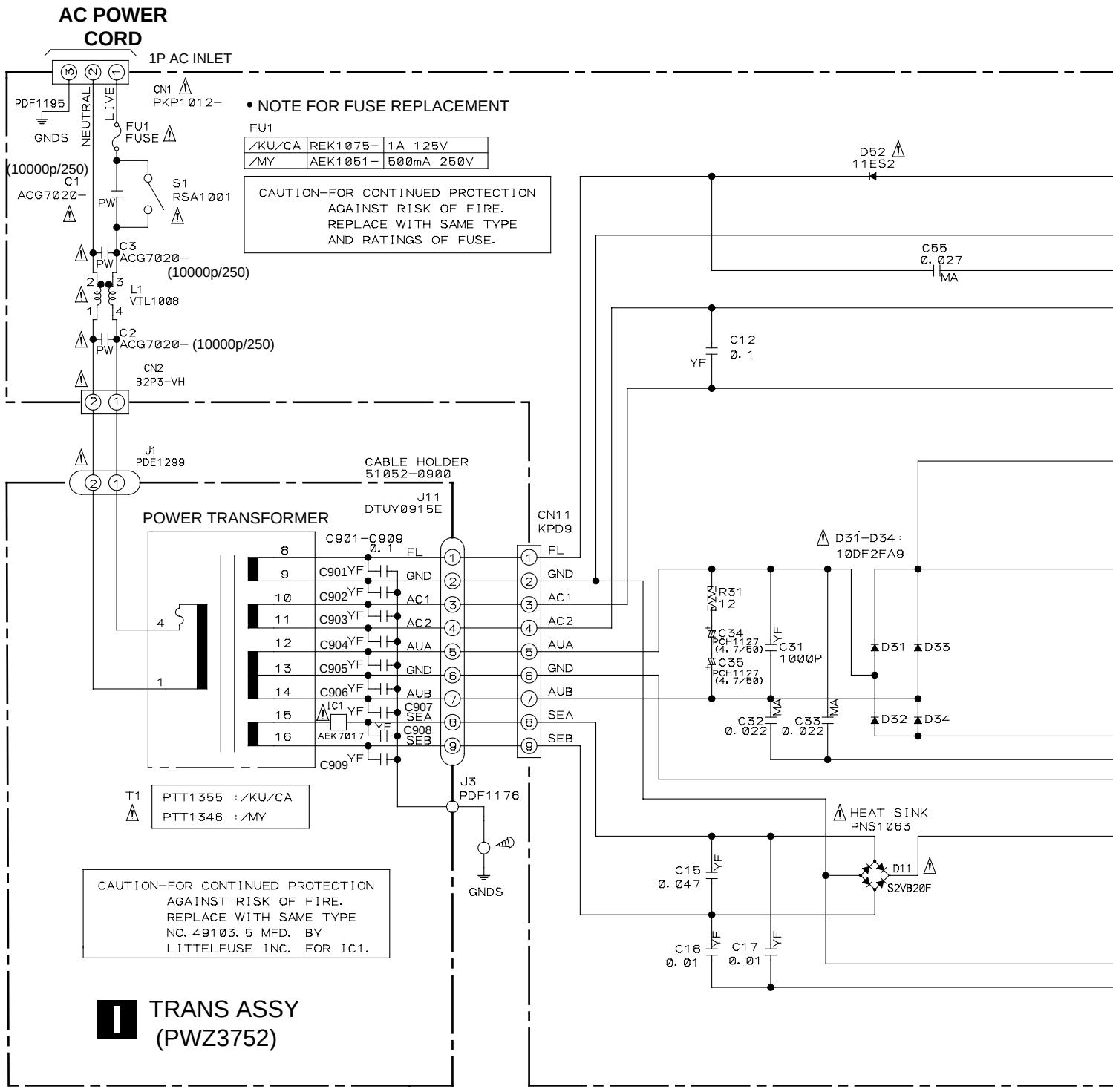
3.9 AUDIO(2/2) and VR ASSEMBLIES

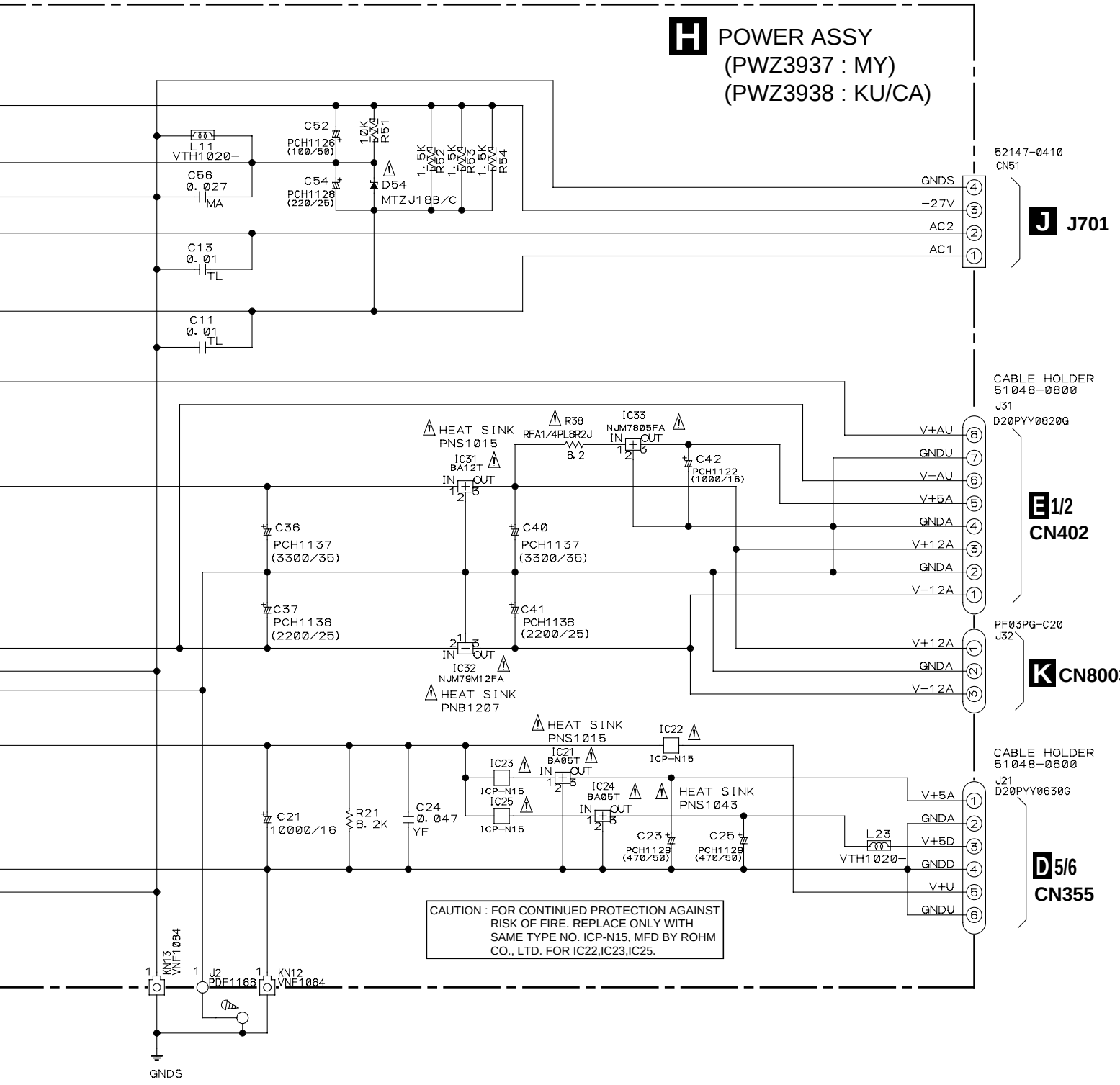




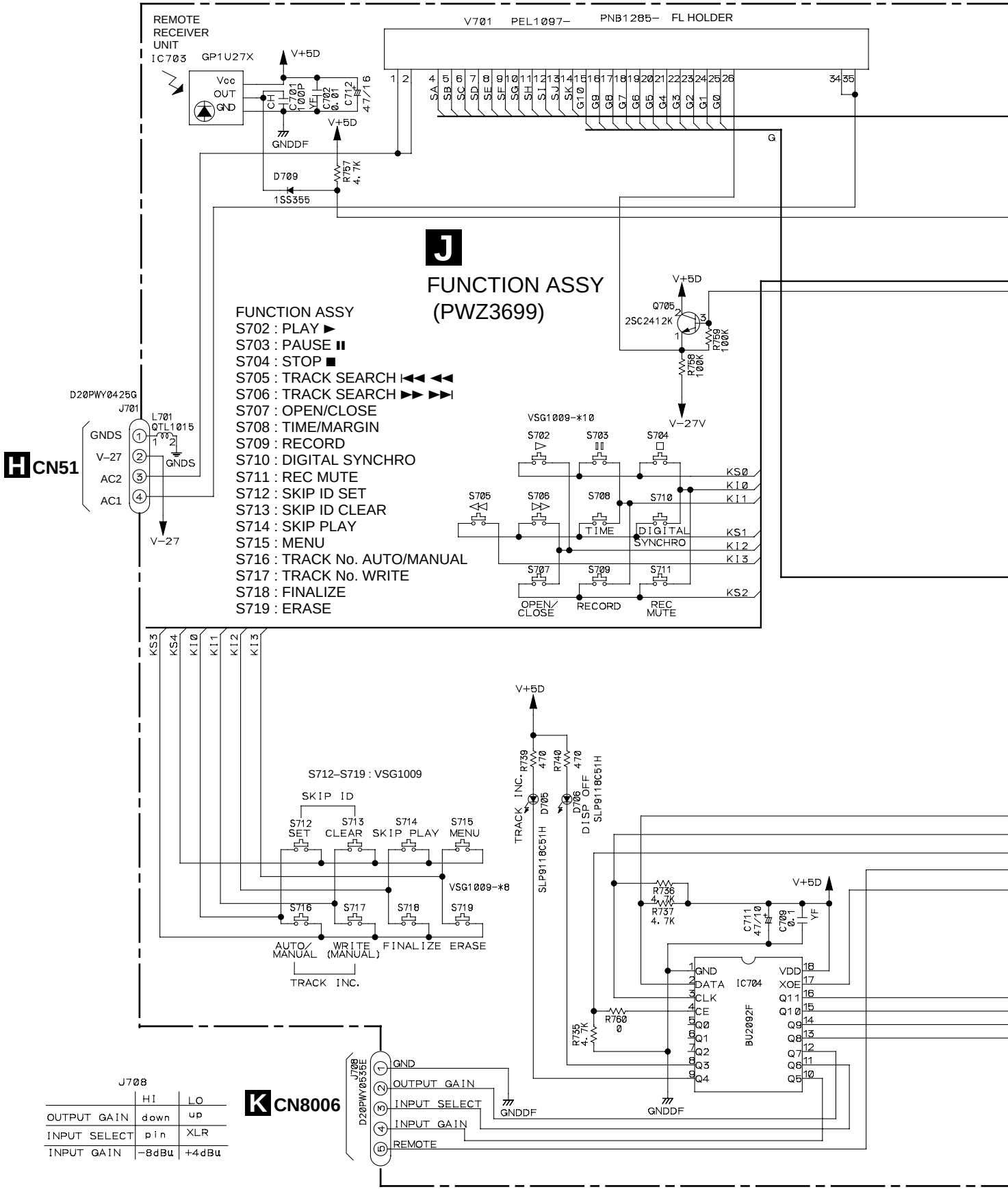

: AUDIO SIGNAL ROUTE
E 2/2 AUDIO ASSY(2/2)
(PWZ3933 : MY)
(PWZ3934 : KU/CA)
• A/D BLOCK
V+5A
IC801
AK5340-VS
A/D CONVERTER
GAUD
D803 DAN202K
D804 DAP202K
D802 DAP202K
D801 DAN202K
R823 300
R821 47K
R825 47K
R819 300
R820 300
R826 47K
R822 47K
R824 300
C819 820PYB
C820 820PYB
C833 10/50
C834 0.1YF
C832 4.7/50
C831 0.1YF
C846 0.01YF
C835 10/50
C836 0.1YF
C847 0.1YF
R827 470
R832 0
L/R SMODE CMODE TST2 PD SEL18 TST1 NC NC AGND VA+ VREFIN AINL- AINL+
SCLK SDATA FSYNC VDP+ DGND CLK TST3 TST4 NC VDB+ NC VREF AINR- AINR+
ADSTBY
ADDATA
ADBCLK
ADLRCK
E 1/2
from ENCODE IC
to ENCODE IC
from ENCODE IC
from ENCODE IC
from DAC
MCK
MCK E 1/2

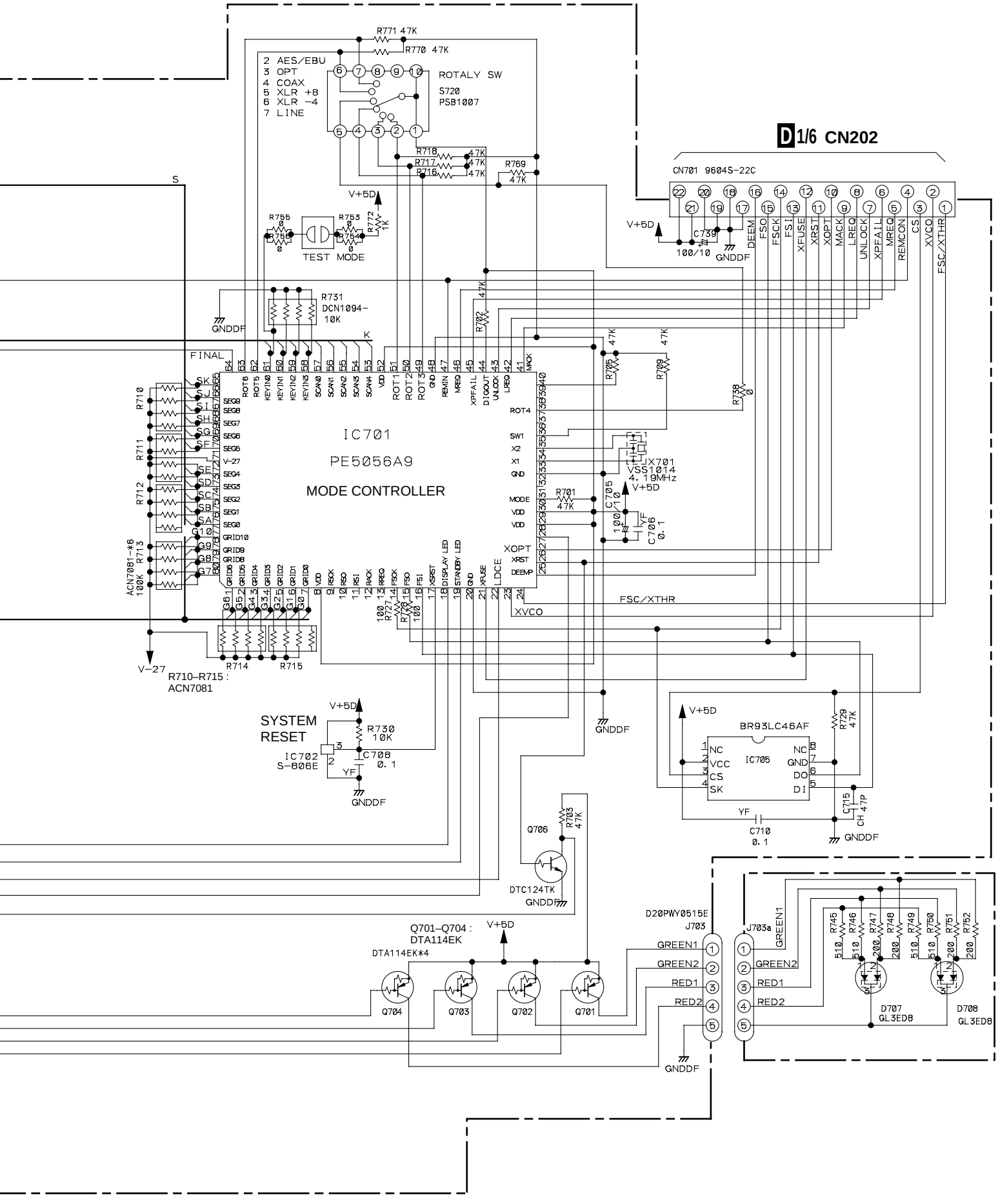
3.10 POWER and TRANS ASSEMBLIES



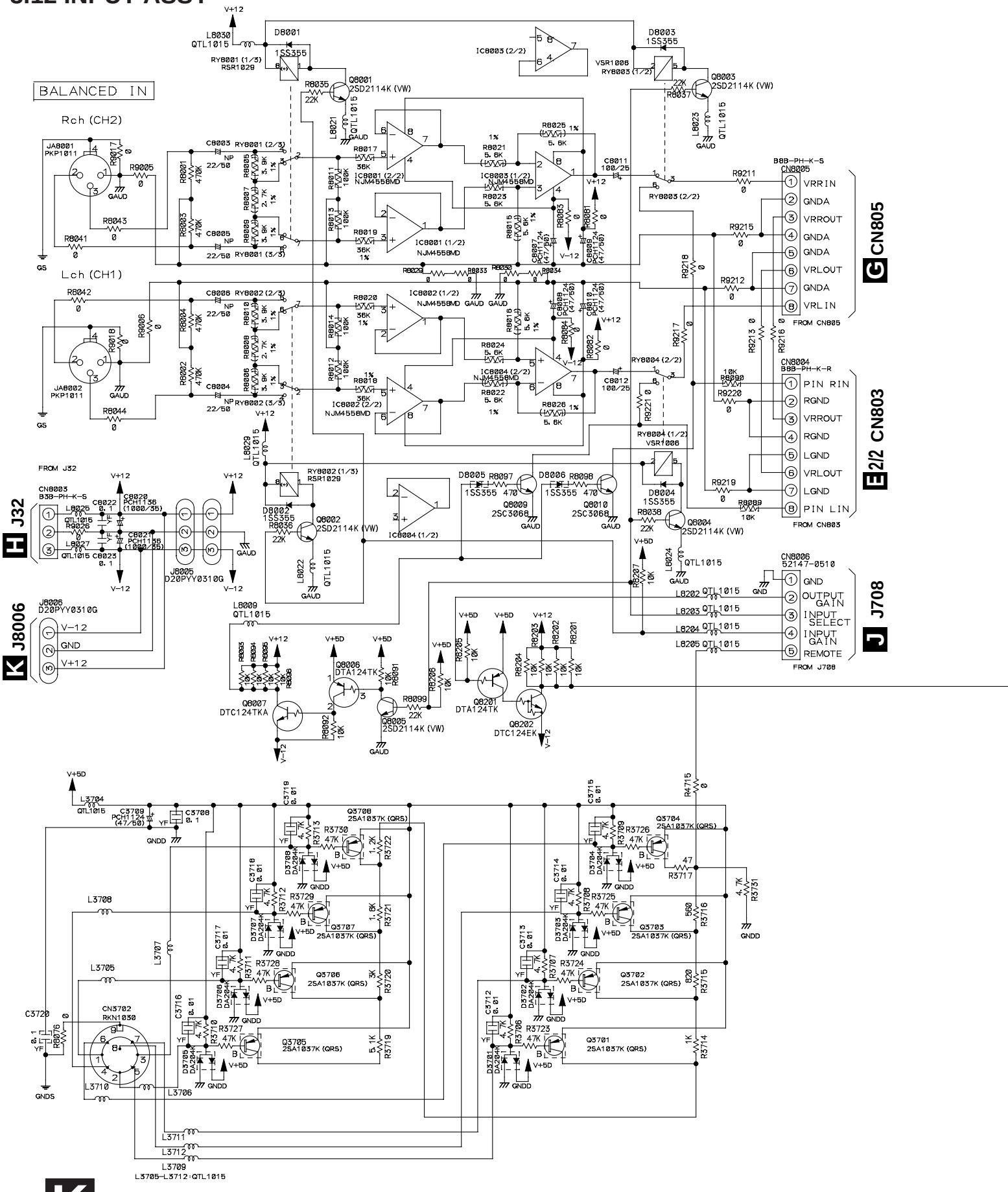

H POWER ASSY
(PWZ3937 : MY)
(PWZ3938 : KU/CA)
52147-0410
CN51
GNDS
-27V
AC2
AC1
J J701
CABLE HOLDER
51048-0800
J31
D20PYY0820G
V+AU
GNDU
V-AU
V+5A
GNDA
V+12A
GNDA
V-12A
E 1/2
CN402
PF03PG-C20
J32
V+12A
GNDA
V-12A
K CN8003
CABLE HOLDER
51048-0600
J21
D20PYY0630G
V+5A
GNDA
V+5D
GNDD
V+U
GNDU
D 5/6
CN355
C52
PCH1126
(100/50)
C54
PCH1128
(220/25)
C56
0.027
MA
C13
0.01
TL
C11
0.01
TL
L11
VTH1020-
10K
1/4W
R51
D54
MTZJ18B/C
1.5K
1/4W
R52
1.5K
1/4W
R53
1.5K
1/4W
R54
HEAT SINK
PNS1015
R38
RFA1/4PL8R2J
8.2
IC33
NJM7805FA
IC31
BA12T
C42
PCH1122
(1000/16)
C36
PCH1137
(3300/35)
C40
PCH1137
(3300/35)
C37
PCH1138
(2200/25)
C41
PCH1138
(2200/25)
IC32
NJM79M12FA
HEAT SINK
PNB1207
HEAT SINK
PNS1015
IC22
ICP-N15
IC21
BA05T
IC23
ICP-N15
IC24
BA05T
IC25
ICP-N15
HEAT SINK
PNS1043
C21
10000/16
R21
8.2K
C24
0.047
YF
C23
PCH1129
(470/50)
C25
PCH1129
(470/50)
L23
VTH1020-
CAUTION : FOR CONTINUED PROTECTION AGAINST
RISK OF FIRE. REPLACE ONLY WITH
SAME TYPE NO. ICP-N15, MFD BY ROHM
CO., LTD. FOR IC22,IC23,IC25.
KN13
VNF1084
J2
PDF1168
KN12
VNF1084
GNDS

3.11 FUNCTION ASSY



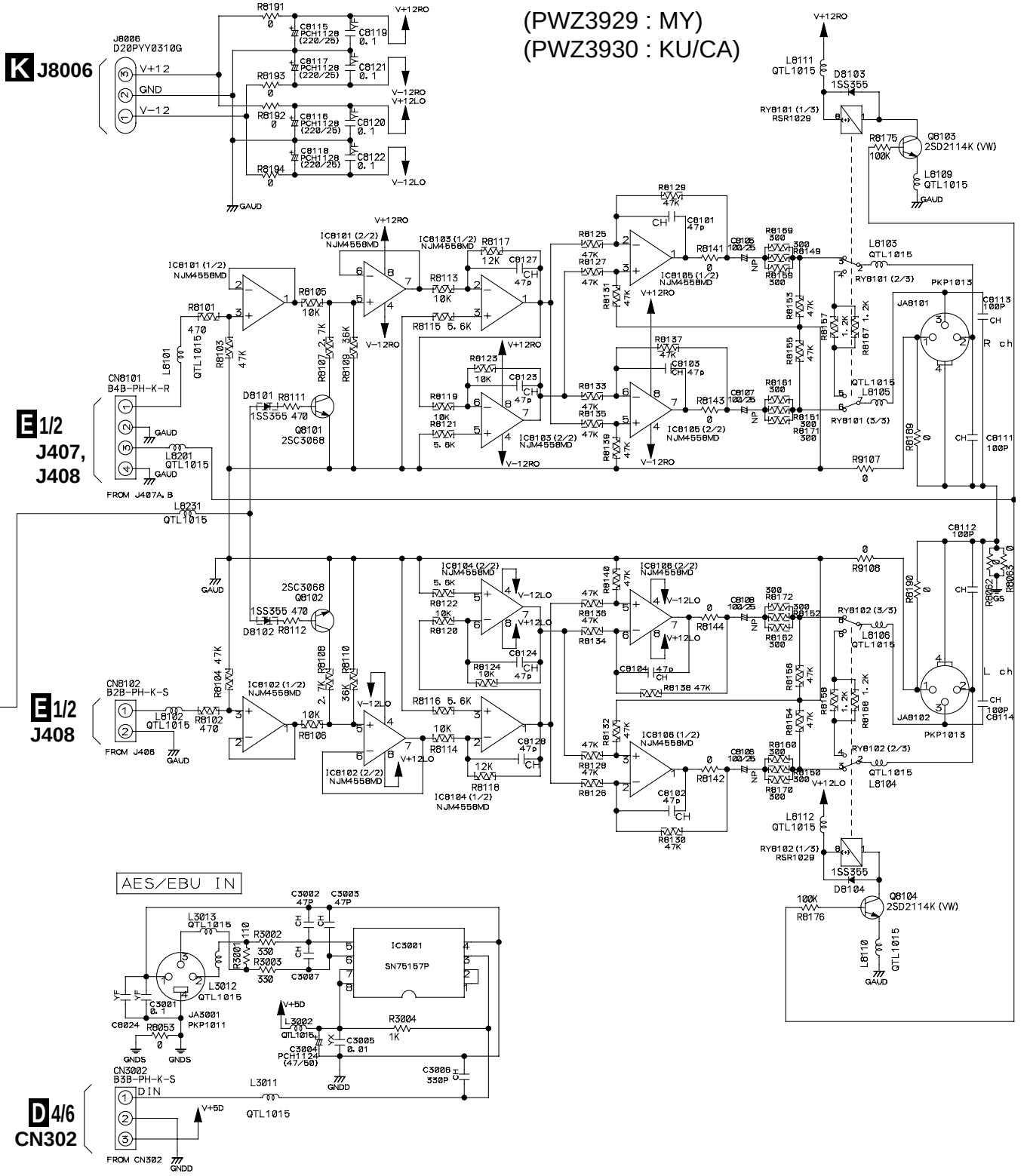

D 1/6 CN202
CN701 9604S-22C
IC701
PE5056A9
MODE CONTROLLER
FINAL
ROTARY SW
S720
PSB1007
2 AES/EBU
3 OPT
4 COAX
5 XLR +8
6 XLR −4
7 LINE
TEST MODE
R731
DCN1094-
10K
R710–R715 :
ACN7081
SYSTEM
RESET
IC702
S-806E
R730
10K
C708
0.1
X701
VSS1014
4.19MHz
BR93LC46AF
IC705
Q706
DTC124TK
Q701–Q704 :
DTA114EK
DTA114EK*4
Q704
Q703
Q702
Q701
D20PWY0515E
J703
J703a
GREEN1
GREEN2
RED1
RED2
D707
GL3ED8
D708
GL3ED8
V+5D
GNDDF
V−27
FSC/XTHR
XVCO

3.12 INPUT ASSY



K

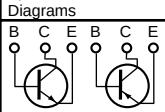
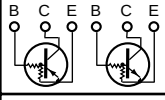
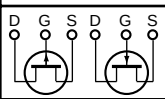
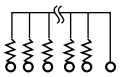
INPUT ASSY
(PWZ3929 : MY)
(PWZ3930 : KU/CA)



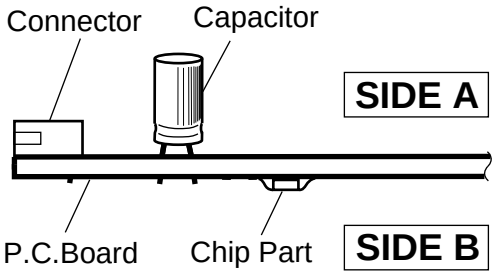
4. PCB CONNECTION DIAGRAM

NOTE FOR PCB DIAGRAMS :

1. Part numbers in PCB diagrams match those in the schematic diagrams.
2. A comparison between the main parts of PCB and schematic diagrams is shown below.

Symbol In PCB Diagrams	Symbol In Schematic Diagrams	Part Name
		Transistor
		Transistor with resistor
		Field effect transistor
		Resistor array
		3-terminal regulator

3. The parts mounted on this PCB include all necessary parts for several destinations.
   For further information for respective destinations, be sure to check with the schematic diagram.
4. View point of PCB diagrams.



4.1 LOADING A, LOADING B and SERVO MECH ASSEMBLIES

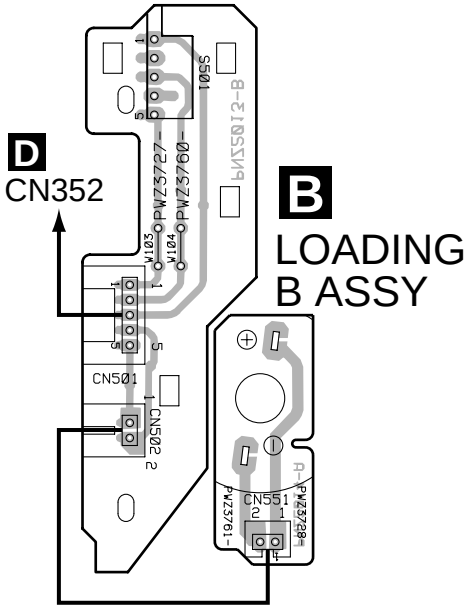
SIDE A

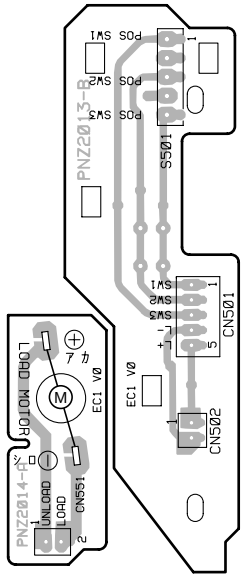
SIDE B

A
LOADING A ASSY

D
CN352

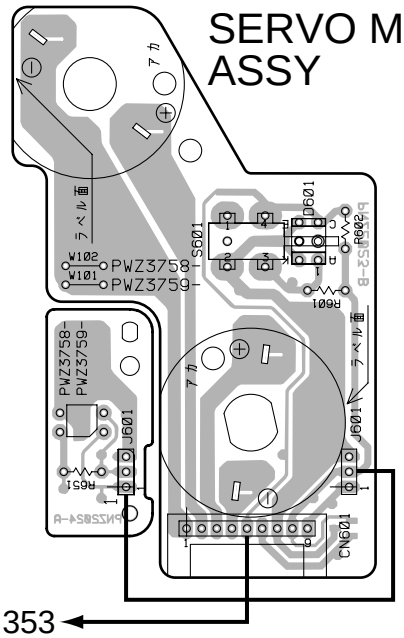
B
LOADING
B ASSY

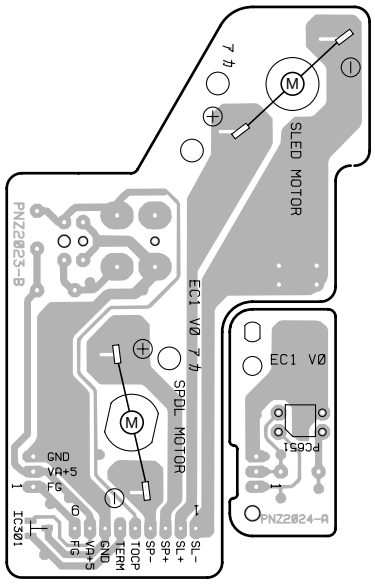




(PNP1447-B)

C
SERVO MECH
ASSY

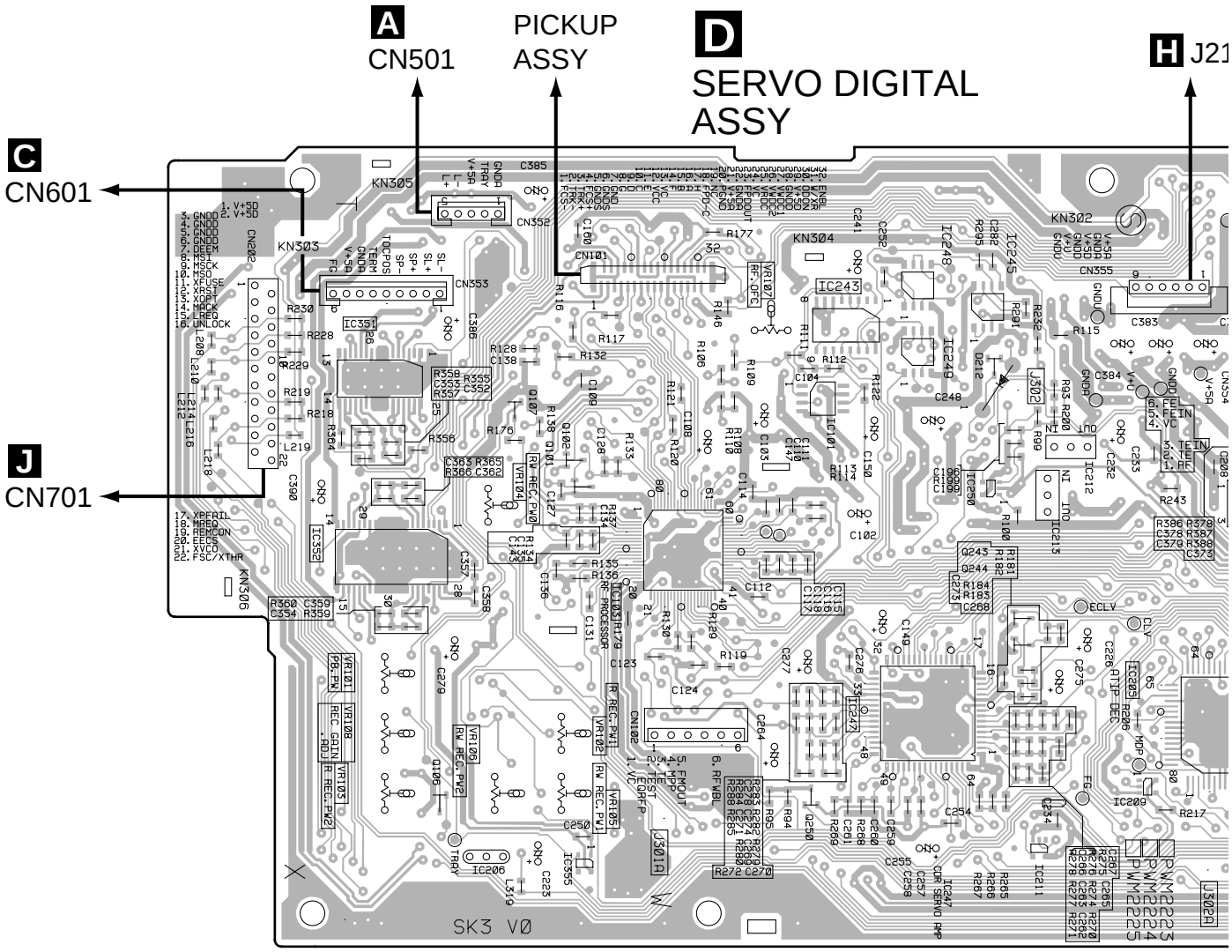




(PNP1447-B)

D CN353

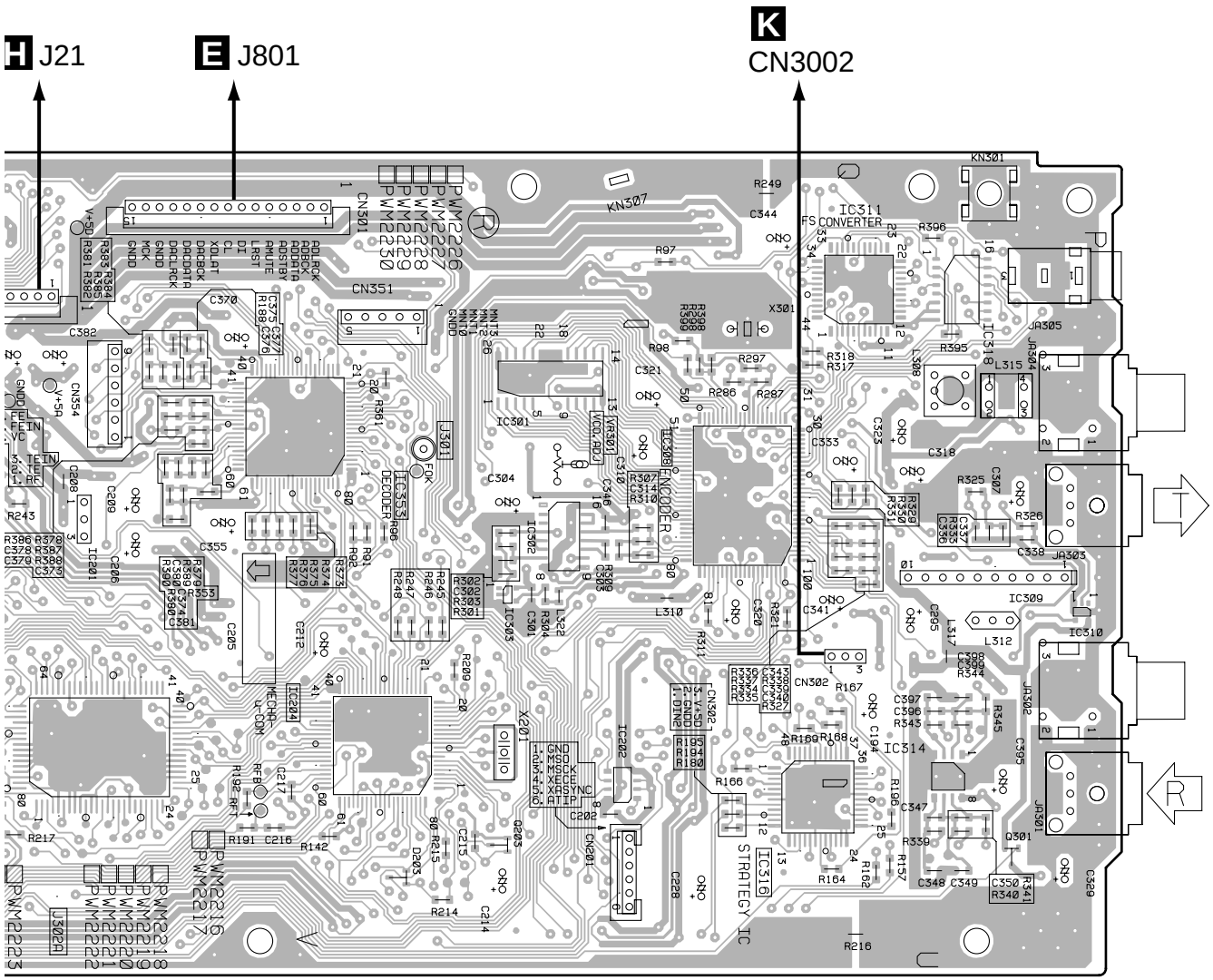
4.2 SERVO DIGITAL ASSY



VR101
VR108
VR103
VR104
VR106
VR102
VR105
VR107

IC351
IC352
Q106
Q107
IC206
Q102
Q101
IC355
IC103
IC243
IC101
Q250
IC248
IC249
IC247
IC245
IC250
Q243
Q244
IC211
IC212
IC213
IC209

SIDE A

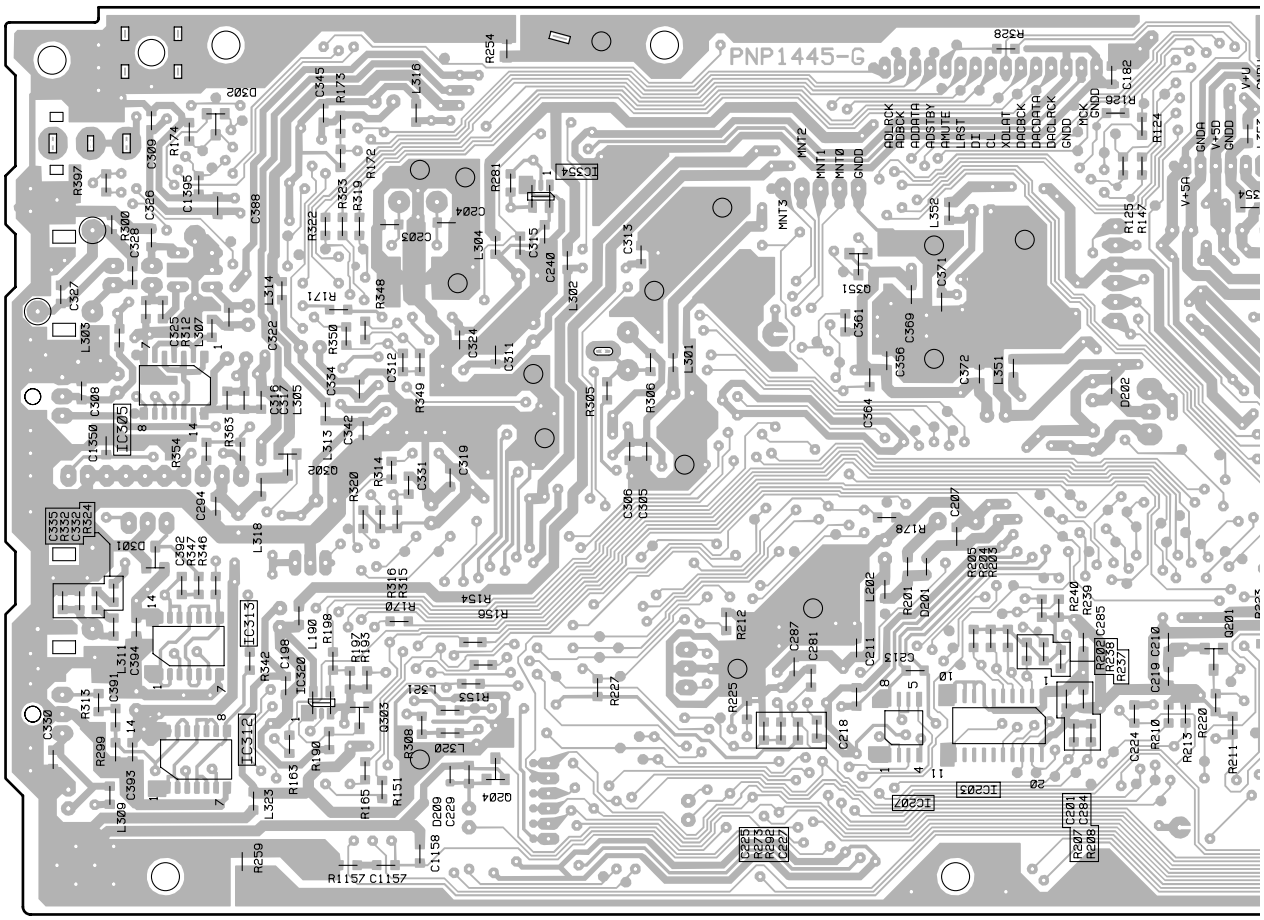


(PNP1445-G)

IC353 IC301 IC308 IC311 IC318
IC201 IC302 IC309 IC310
IC205 IC204 IC303 IC202 IC316 IC314 Q301
Q203

09

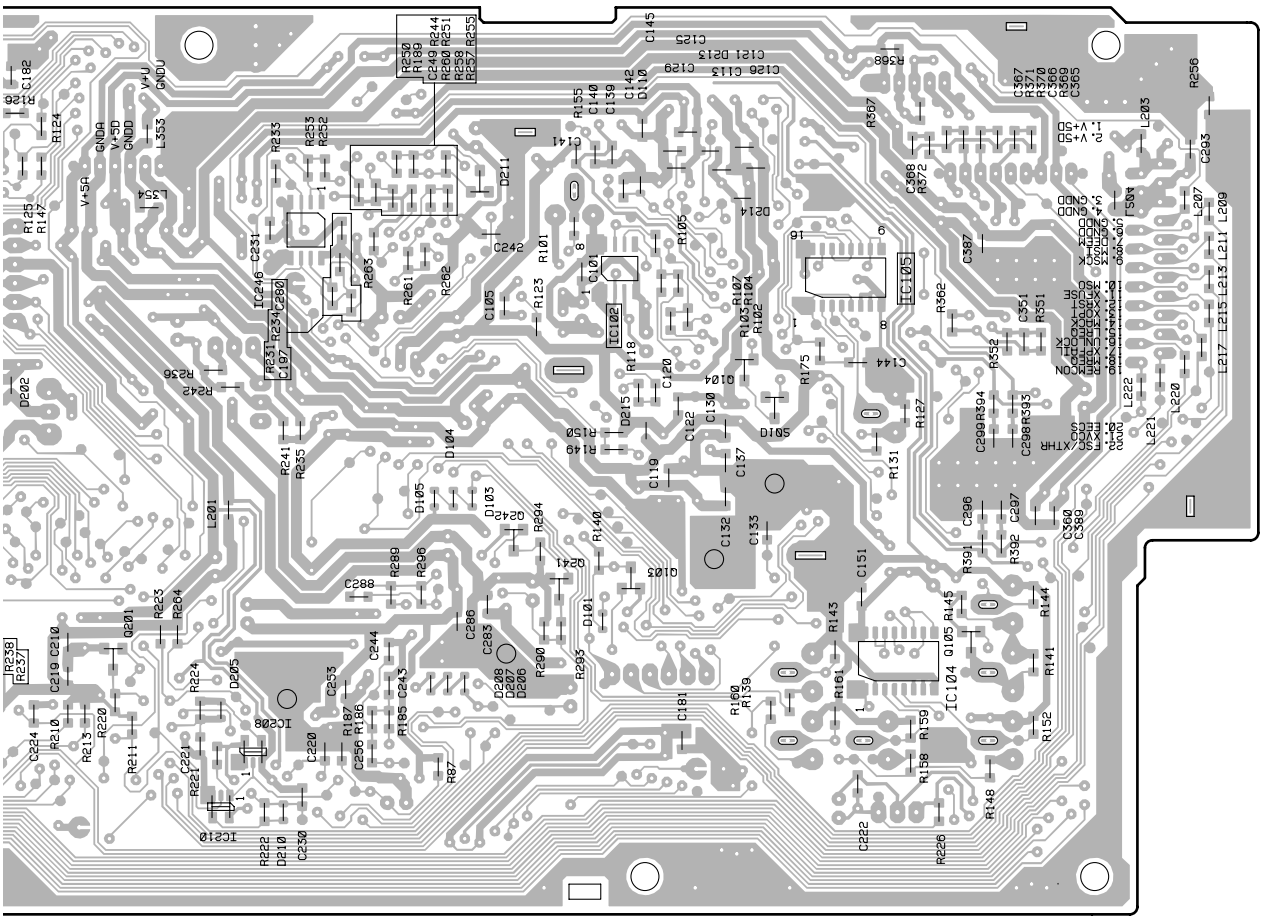
D SERVO DIGITAL ASSY



(PNP1445-G)

IC305 Q302 IC354 Q351
IC313 IC320 Q303 Q201
IC312 Q204 IC207 IC203

SIDE B

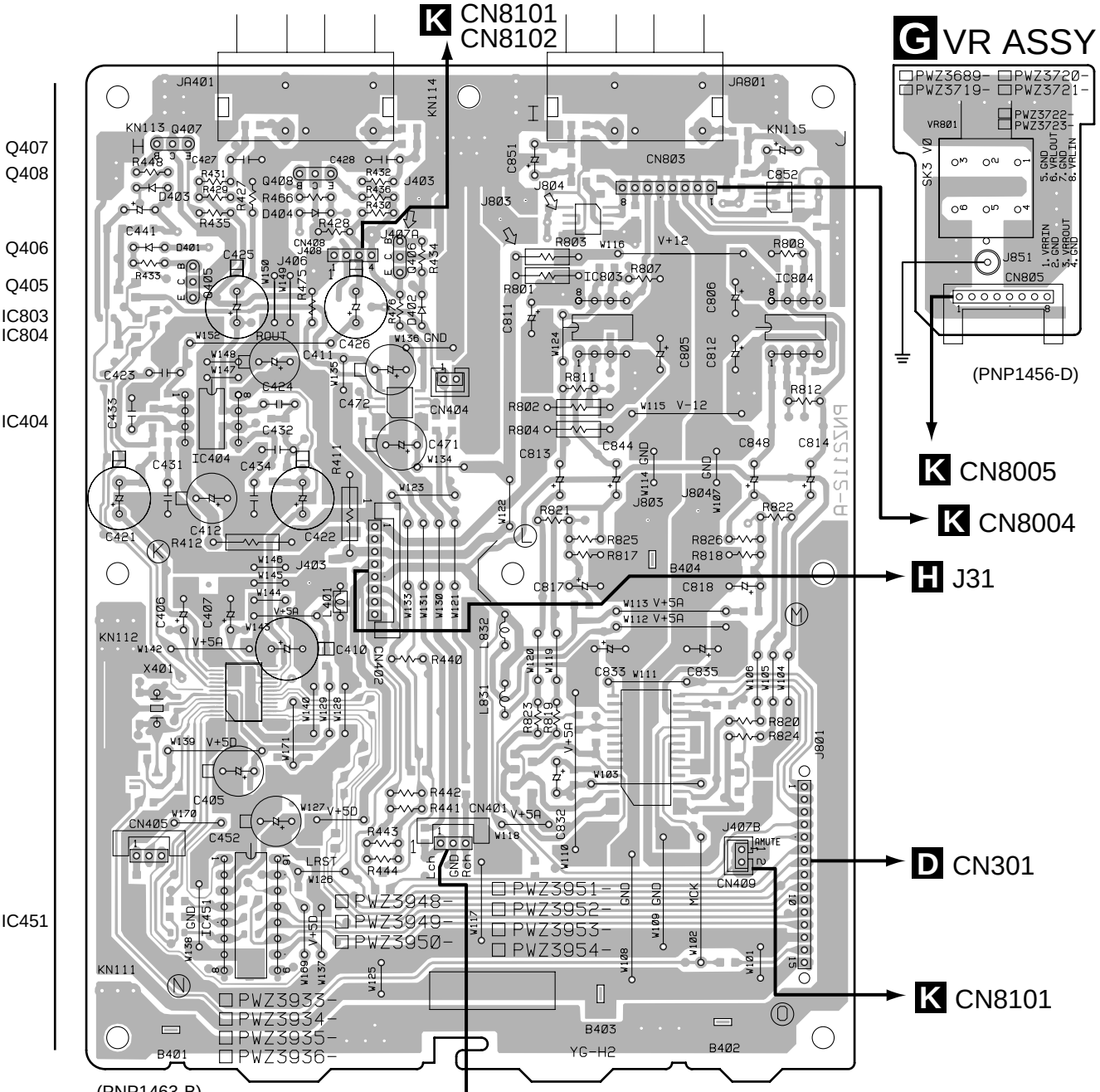


IC246 Q242 IC105

Q201 Q241 IC102 Q104 IC104 Q105

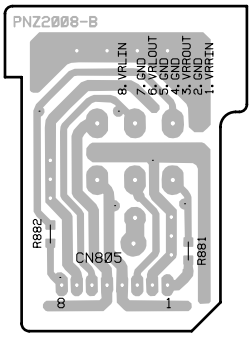
IC210 IC208 Q103

4.3 AUDIO, HEADPHONE and VR ASSEMBLIES



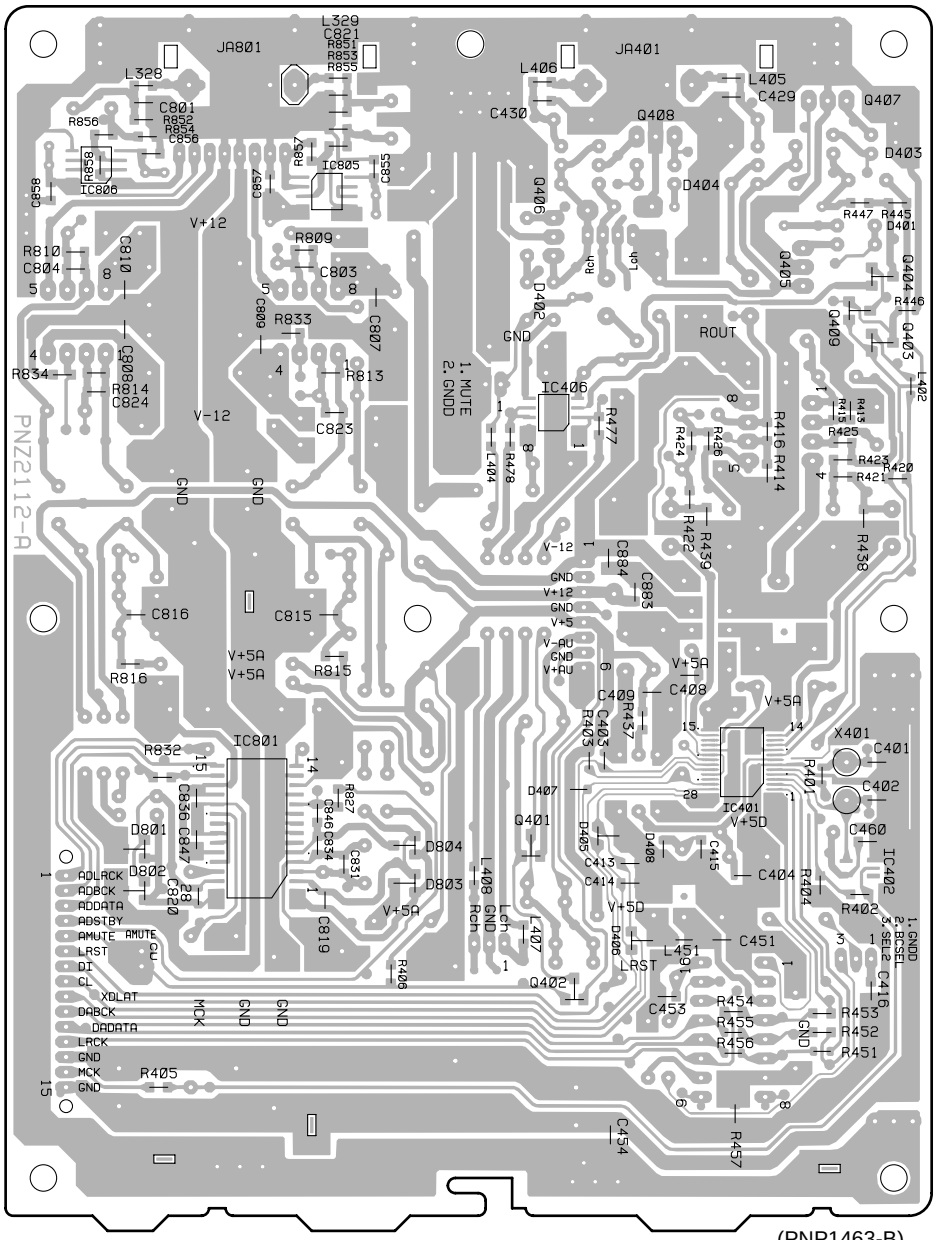
SIDE A

G VR ASSY



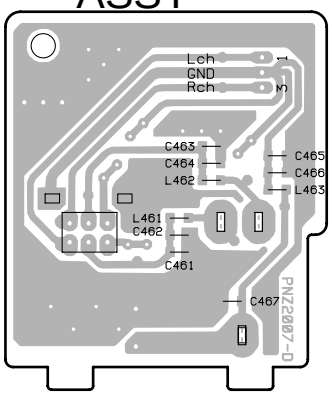
(PNP1456-D)

E AUDIO ASSY



(PNP1463-B)

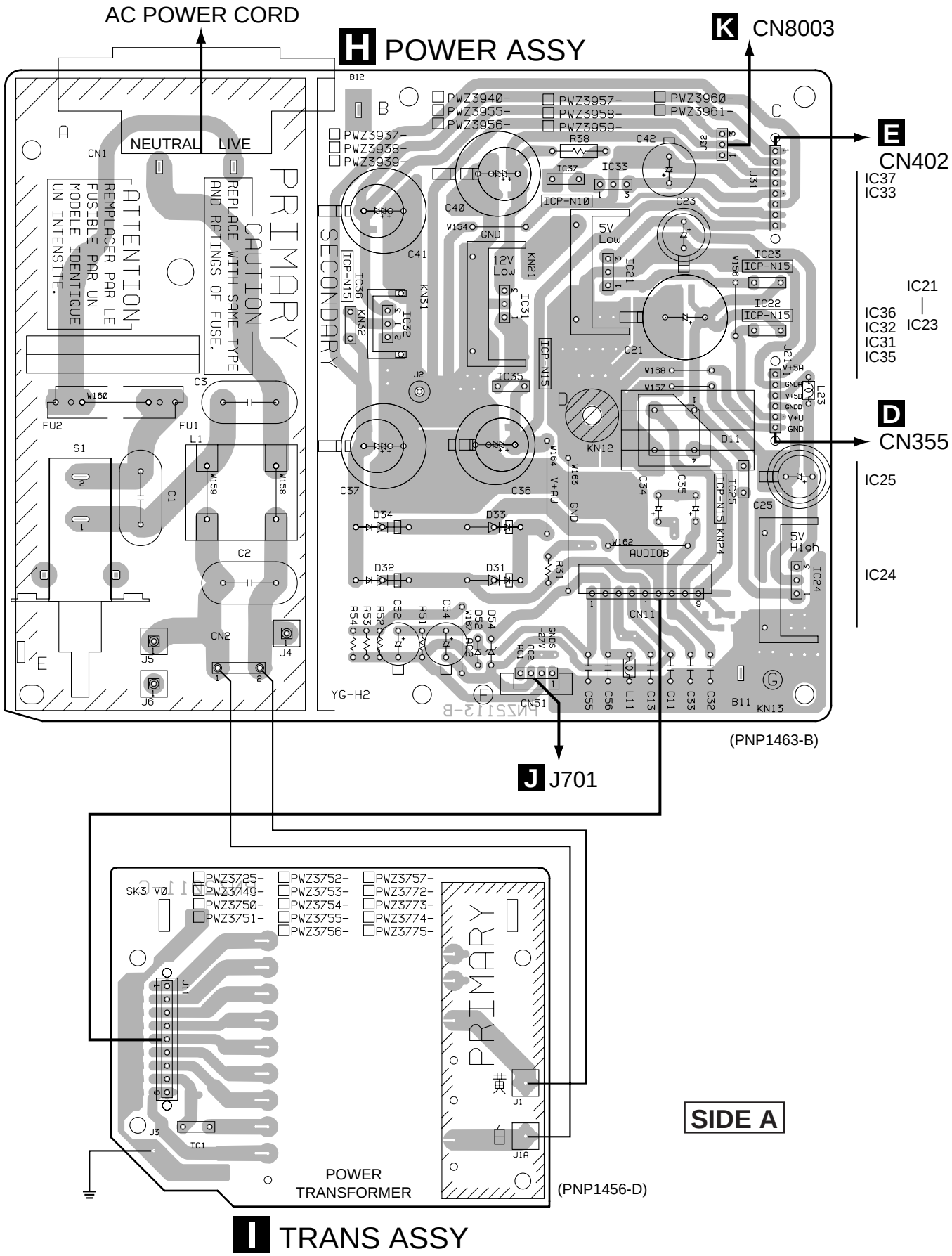
F HEADPHONE ASSY



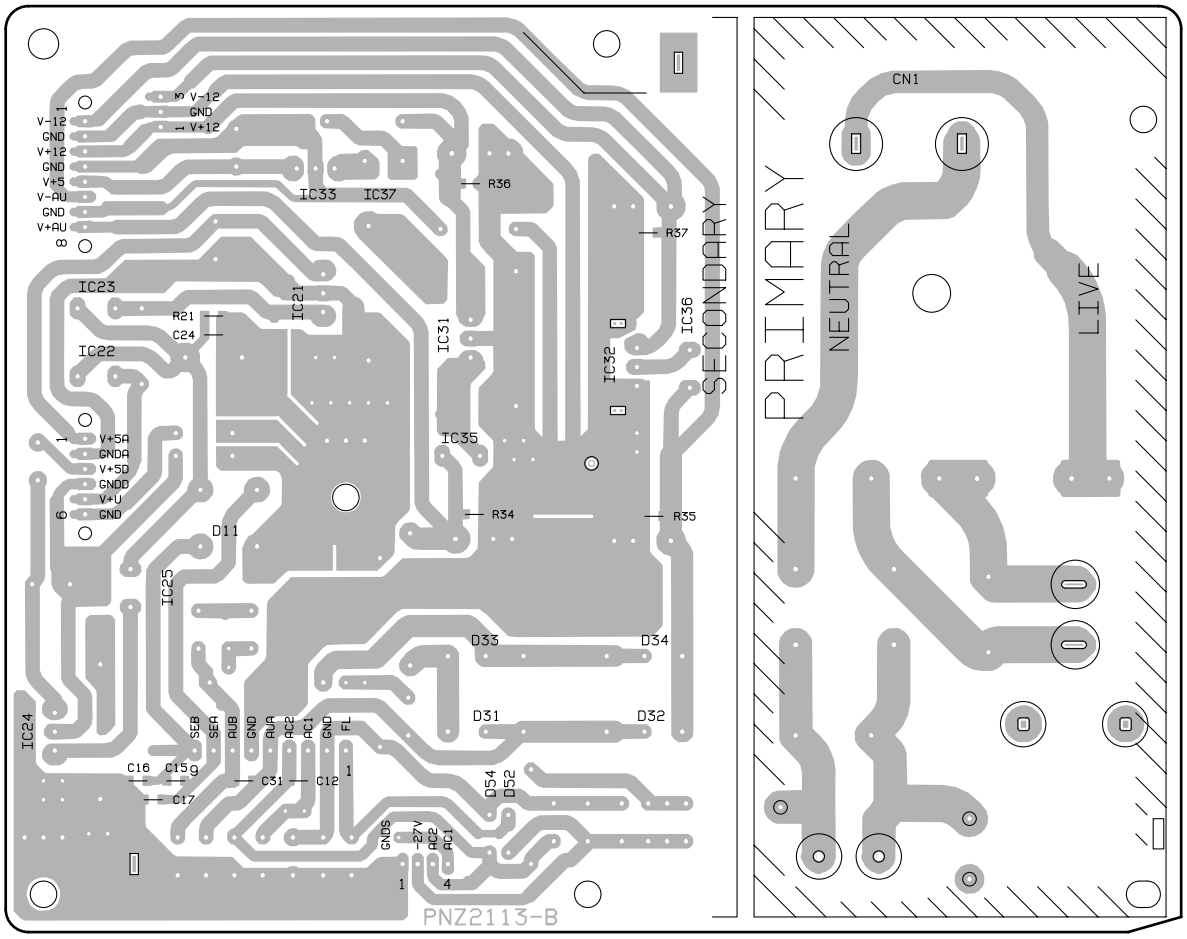
(PNP1456-D)

SIDE B

4.4 POWER and TRANS ASSEMBLIES

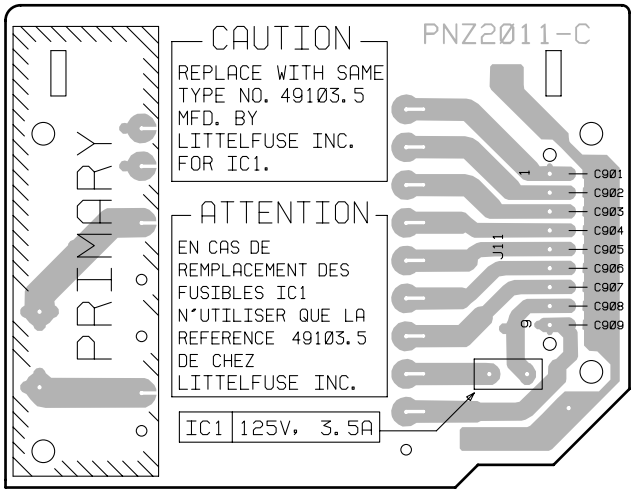


H POWER ASSY



(PNP1463-B)

I TRANS ASSY

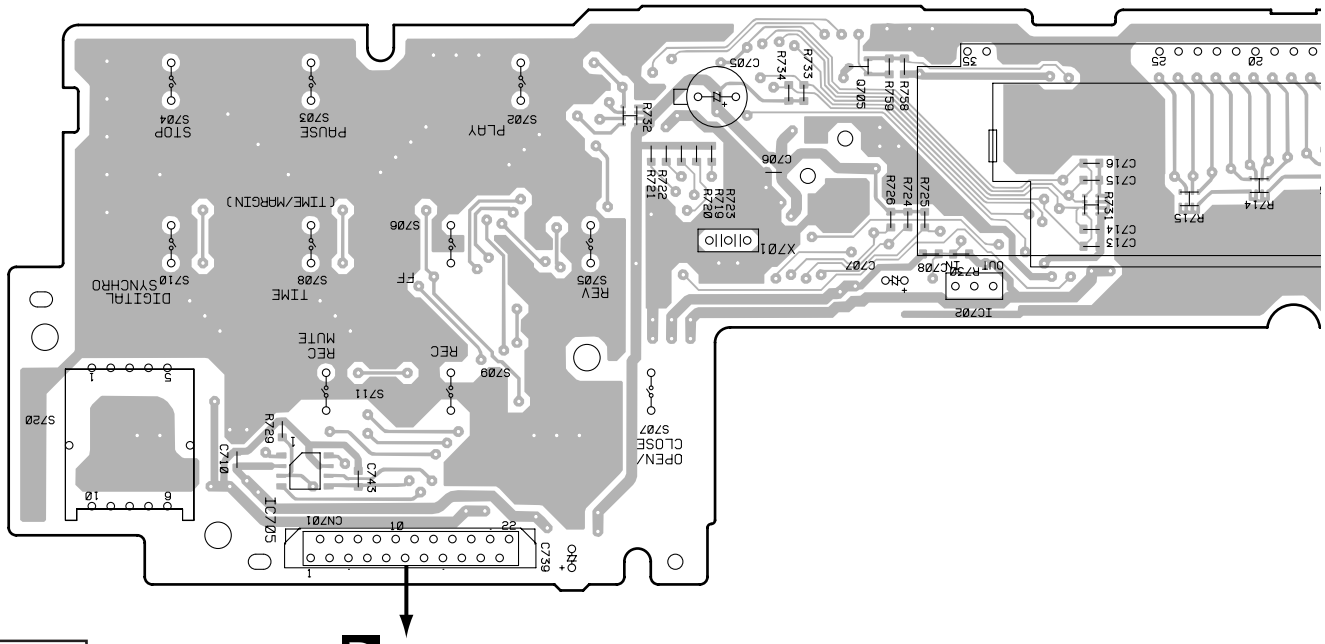


SIDE B

(PNP1456-D)

4.5 FUNCTION ASSY

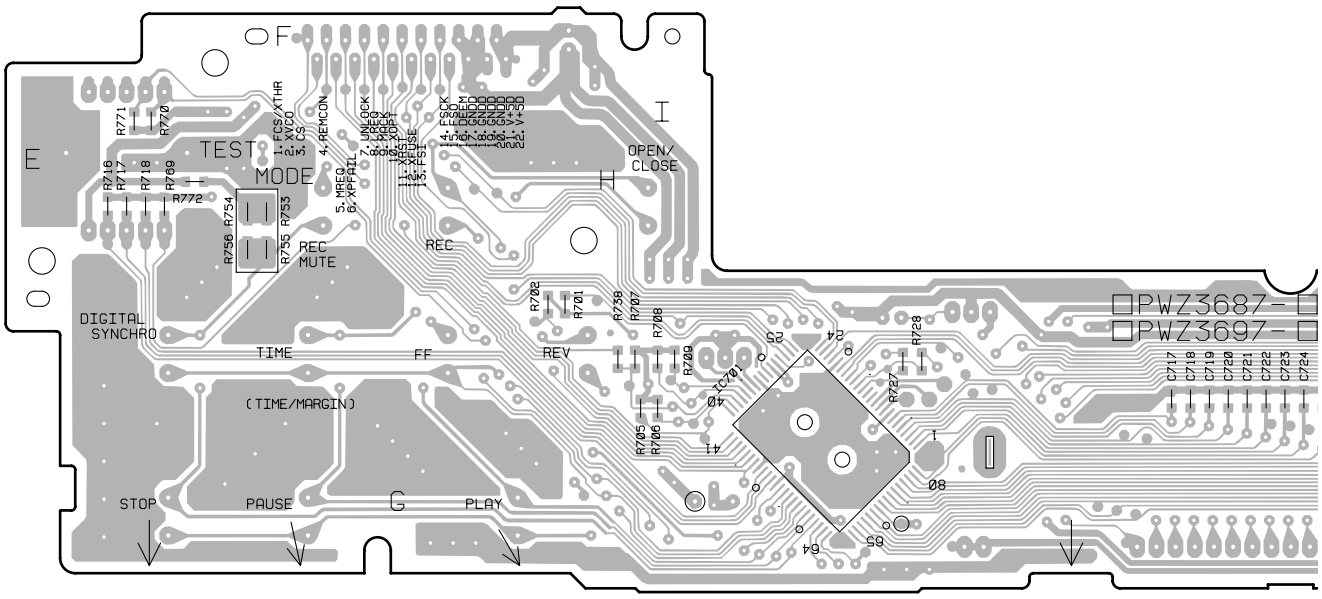
J FUNCTION ASSY



SIDE A

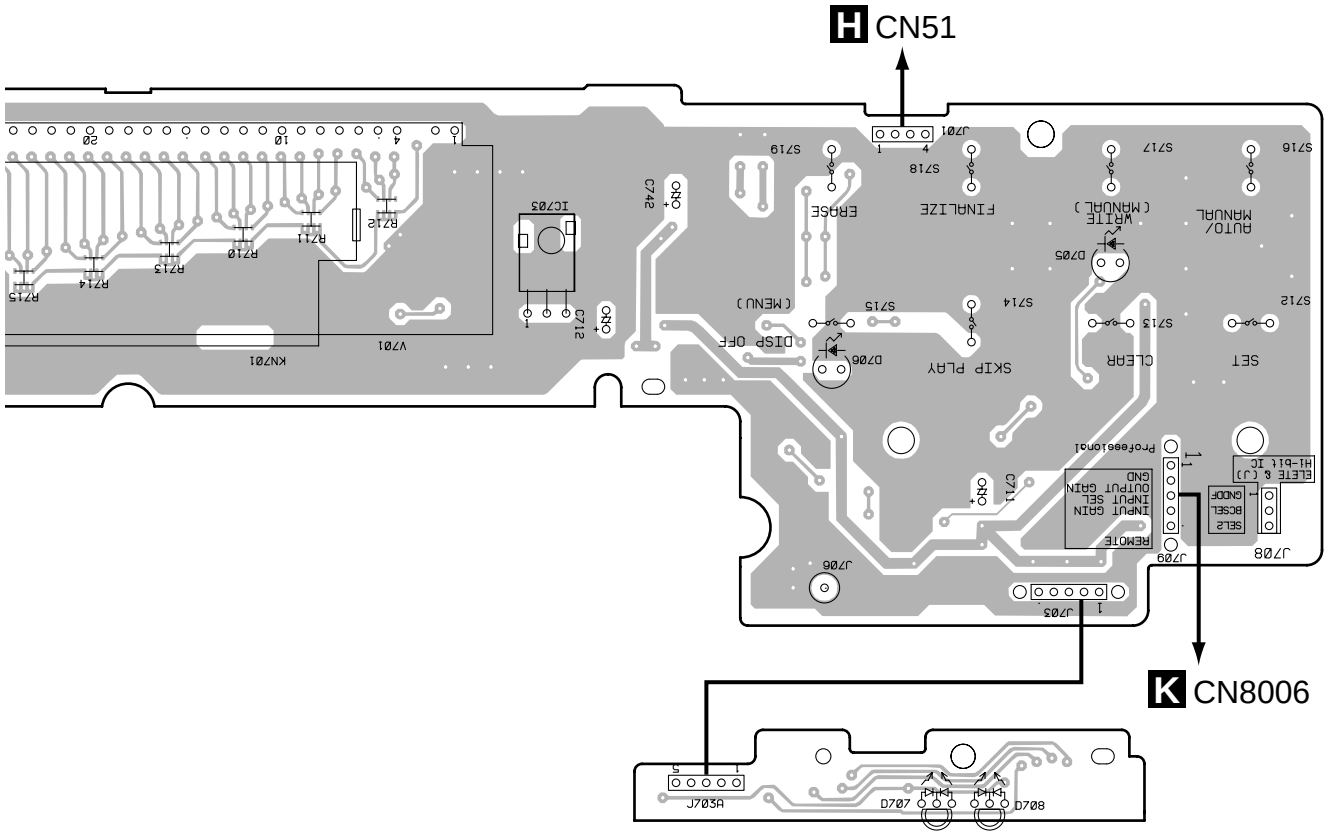
IC705 Q705 IC702

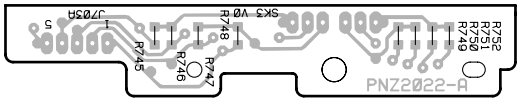
J FUNCTION ASSY

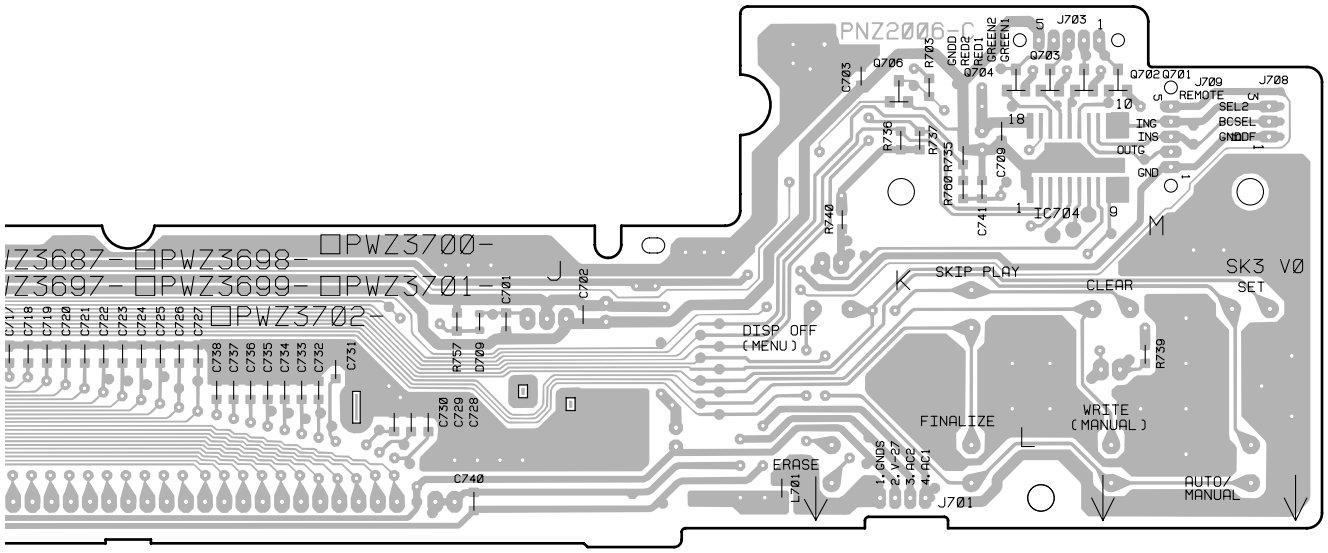


SIDE B

IC701



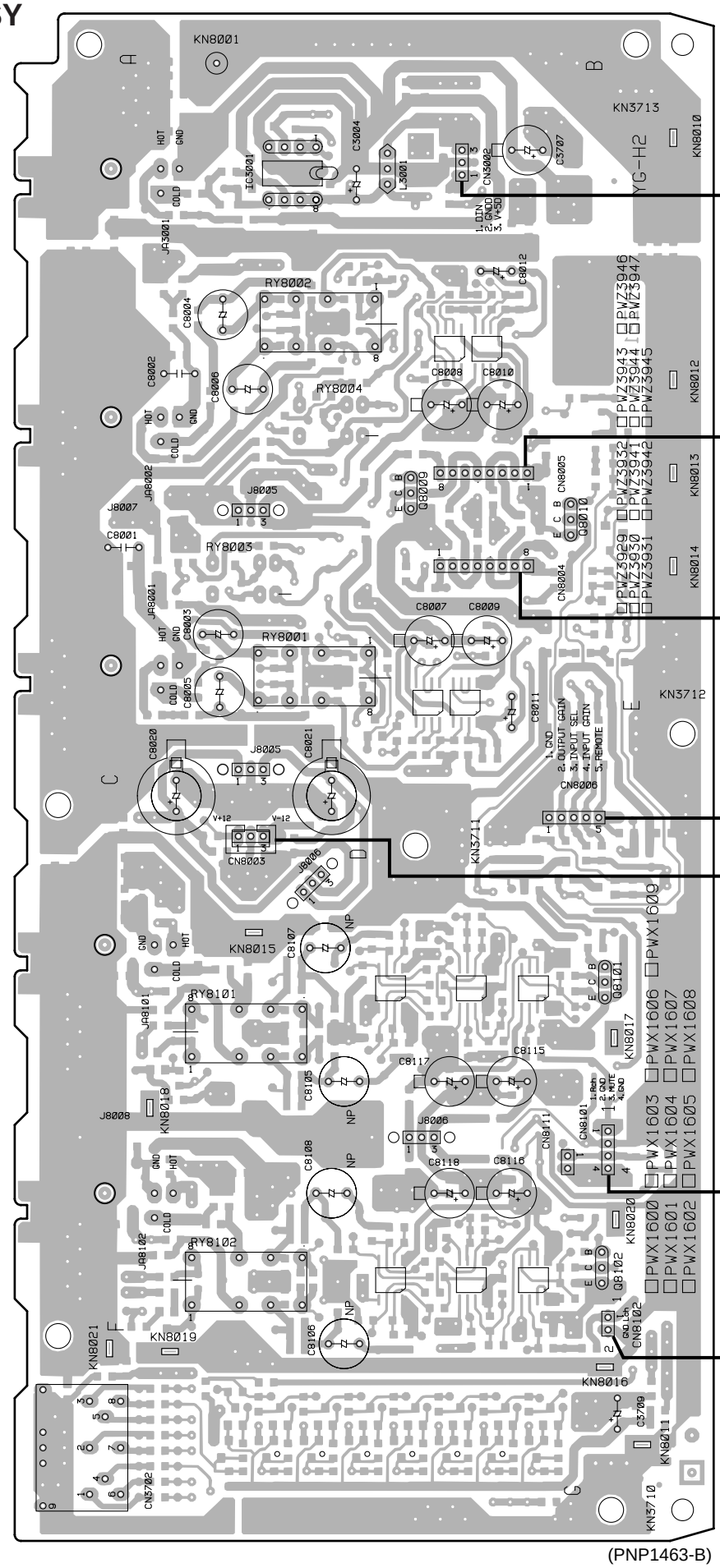




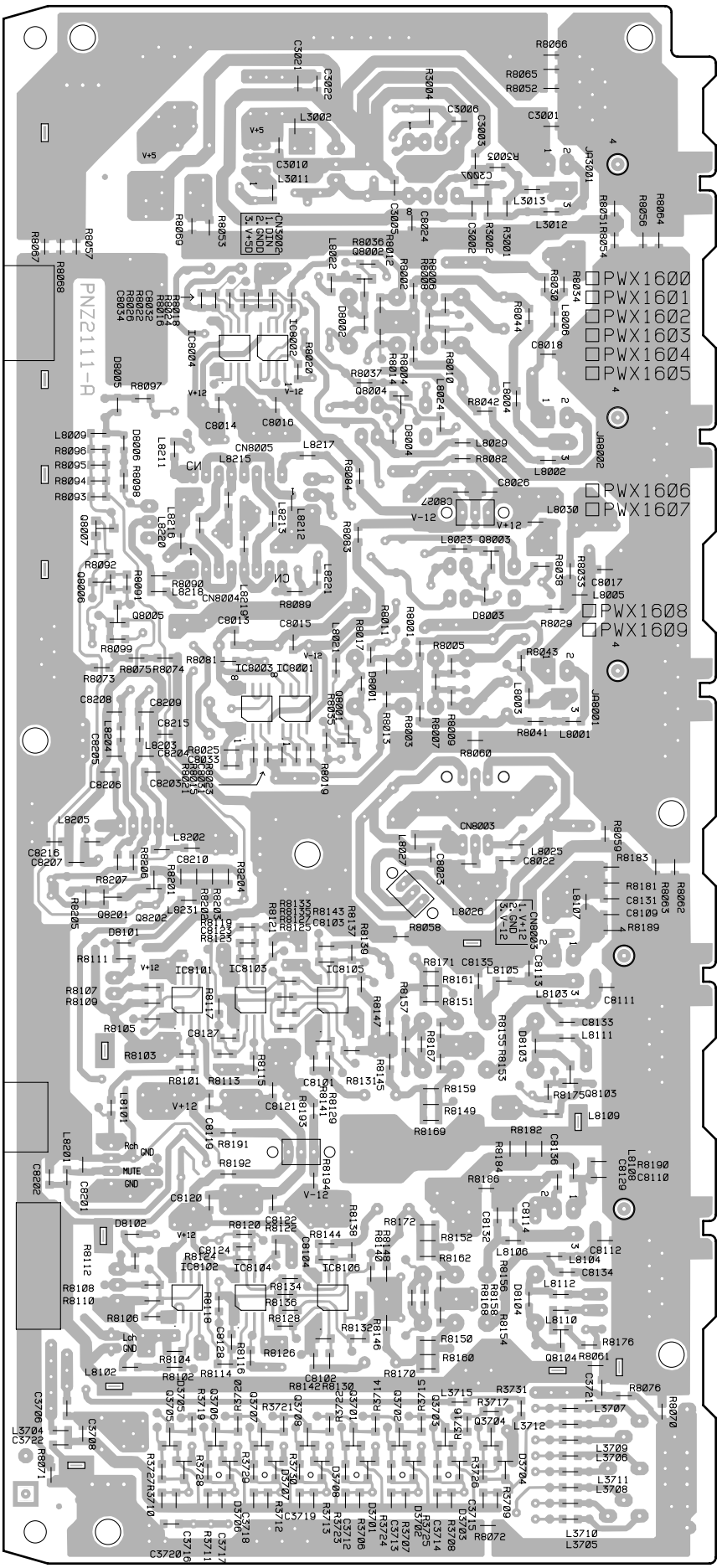
IC704
Q706 Q701 — Q704

K INPUT ASSY

4.6 INPUT ASSY



K INPUT ASSY



(PNP1463-B)

SIDE B

5. PCB PARTS LIST

NOTES: ●*Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.*
●*The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
●*When ordering resistors, first convert resistance values into code form as shown in the following examples.*
Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).
560 Ω → 56×10^1 → 561 ..... RD1/4PU 5 6 1 J
47k Ω → 47×10^3 → 473 ..... RD1/4PU 4 7 3 J
0.5 Ω → R50 ..... RN2H R 5 0 K
1 Ω → 1R0 ..... RS1P 1 R 0 K
Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).
5.62k Ω → 562×10^1 → 5621 ..... RN1/4PC 5 6 2 1 F

■ LIST OF WHOLE PCB ASSEMBLIES

Mark	Symbol and Description	Part No.		Remarks
		MY Type	KU/CA Type	
NSP	SERVO MECH ASSY	PWX1569	PWX1569	
NSP	├─LOADING A ASSY	PWZ3727	PWZ3727	
NSP	├─LOADING B ASSY	PWZ3728	PWZ3728	
NSP	└─SERVO MECH ASSY	PWZ3758	PWZ3758	
NSP⚠	SERVO DIGITAL ASSY	PWM2219	PWM2220	
NSP⚠	POWER AUDIO I/O ASSY	PWX1600	PWX1601	
	├─INPUT ASSY	PWZ3929	PWZ3930	
	├─AUDIO ASSY	PWZ3933	PWZ3934	
⚠	└─POWER ASSY	PWZ3937	PWZ3938	
NSP⚠	FUNCTION ASSY	PWX1595	PWX1595	
NSP	├─FUNCTION ASSY	PWZ3699	PWZ3699	
NSP	├─HEADPHONE ASSY	PWZ3715	PWZ3715	
NSP	├─VR ASSY	PWZ3719	PWZ3719	
NSP	└─TRANS ASSY	PWZ3752	PWZ3752	

Mark	No.	Description	Part No.

A LOADING A ASSY

SWITCH

	S501		VSK1011

OTHERS

	CN502	KR CONNECTOR	S2B-PH-K-S
	CN501	KR CONNECTOR	S5B-PH-K-S

B LOADING B ASSY

OTHERS

	CN551	KR CONNECTOR	B2B-PH-K-S

C SERVO MECH ASSY

SEMICONDUCTORS

	PC651		NJL5803K-F1

SWITCHES AND RELAYS

	S601		PSG1013

RESISTORS

	All Resistors		RD1/4PU□□□J

OTHERS

	J601	3P JUMPER WIRE	D20PWW0305E
	CN601	KR CONNECTOR	S9B-PH-K-S

D SERVO DIGITAL ASSY

(1) CONTRAST TABLE

PWM2220 and PWM2219 are constructed the same except for the following :

Mark	Symbol and Description	Part No.		Remarks
		PWM2219	PWM2220	
	L323	Not used	QTL1015	
	C1157	Not used	CCSQCH101J50	
	R1157	Not used	RS1/10S0R0J	
	R1181,R1323	RS1/10S0R0J	Not used	

Mark	No.	Description	Part No.

(2) PARTS LIST FOR PWM2219

SEMICONDUCTORS

	IC311		AD1893JST
	IC103		AK8563
	IC201		BA05T
	IC351		BA5912AFP-Y
	IC352		BA5932FP
	IC302		BA7082F
	IC353		CXD2585Q
	IC104, IC105, IC243, IC318		HD74HC4053FP
	IC203		HD74HC573FP
	IC308		LC89585
	IC301		LH64256CK-70
⚠	IC212		LP2950CZ-5.0(NS)
	IC245		M5238AFP
	IC102		MC34072D
	IC246		NJM2100M
	IC250		NJM2107F
	IC101		NJM2136M
	IC207, IC248, IC249, IC314		NJM2904M
	IC247		PA9004A
	IC309		PCX1021
	IC205		PDJ014A
	IC316		PDK041A
	IC204		PE5073A9
	IC206		PST994C
	IC202		TC4W53F
	IC312, IC313		TC74HC00AF
	IC305		TC74HCU04AF
	IC210		TC7S00F
	IC208, IC303		TC7S04F
	IC320		TC7S08F
	IC209, IC211, IC310		TC7S14F
	IC355		TK11041M-1
	Q302		DTA114EK
	Q102, Q301		DTA114TK
	Q242, Q351		DTA124EK
	Q250		DTA124TK
	Q103, Q104, Q241, Q243, Q244		DTC114TK
	Q303		DTC114TK
	Q101, Q107, Q201, Q203, Q204		DTC124EK
	D101, D103–D105, D110		1SS355
	D201, D202, D205–D210		1SS355
	D214, D215		1SS355
	D211, D301		DA204K
	D302		DAN202K
	D203		DAP202K
	D102, D212		MA704

COILS AND FILTERS

	L209		OTL1040
	L308	PULSE TRANS.	PTL1003
⚠	L315	CHOKE COIL	PTL1017
⚠	L312	EMI FILTER	PTL1019
	L1097, L1098, L1151, L1154		QTL1015
	L1156, L1157, L1162, L1163		QTL1015
	L1166–L1171, L190, L201, L202		QTL1015
	L211–L222, L301–L304, L307		QTL1015
	L309	CHIP SOLID INDUCTOR	QTL1015
⚠	L311	CHIP SOLID INDUCTOR	QTL1015
	L313, L314, L317, L318		QTL1015
	L320, L321, L351, L352		QTL1015

CAPACITORS

	C120	CCSQCH100D50
	C306, C316, C325, C326, C338	CCSQCH101J50
	C303	CCSQCH160J50
	C350, C375, C399	CCSQCH221J50
	C203, C204, C278	CCSQCH270J50
	C133, C361	CCSQCH331J50
	C337	CCSQCH470J50
	C231, C377	CCSQCH471J50
	C134	CCSQCH6R0D50
	C1188	CCSQCH681J50
	C1395	CCSQCH820J50
	C104	CCSQCJ3R0C50
	C328	CCSQSL561J50
	C232, C307, C318, C329	CEAT100M50
	C103	CEAT101M10
	C102, C150, C382–C384, C386	CEAT101M16
	C390	CEAT101M16
	C214, C255	CEAT1R0M50
	C206, C212	CEAT221M6R3
	C264, C277	CEAT2R2M50
	C323	CEAT330M25
	C223	CEAT3R3M50
	C108, C194, C395	CEAT470M10
	C149, C209, C226, C241, C248	CEAT470M16
	C275, C279, C295, C304, C310	CEAT470M16
	C320, C321, C333, C341, C344	CEAT470M16
	C355, C370, C385	CEAT470M16
	C228	CEAT4R7M50
	C9327	CKCYF473Z50
	C141, C142, C196, C197, C254	CKSQYB102K50
	C266, C331, C335, C340, C347	CKSQYB102K50
	C351, C364, C376, C396	CKSQYB102K50
	C112, C123, C124, C222, C1350	CKSQYB103K50
	C243, C244, C282, C296–C299	CKSQYB103K50
	C315, C322, C332, C343, C346	CKSQYB103K50
	C365–C368, C373, C391, C392	CKSQYB103K50
	C126, C138, C224, C230, C252	CKSQYB104K25
	C259–C261, C327, C339	CKSQYB104K25
	C115, C127, C131, C249, C312	CKSQYB105K10
	C314	CKSQYB105K10
	C268, C381	CKSQYB152K50
	C348, C349, C397, C398	CKSQYB222K50
	C140, C262	CKSQYB223K50
	C110, C111, C116–C118, C144	CKSQYB224K16
	C216, C217	CKSQYB224K16
	C281	CKSQYB272K50
	C136, C269–C271, C274	CKSQYB331K50
	C135	CKSQYB333K50
	C128, C256–C258, C276	CKSQYB334K16
	C221, C288, C354, C358, C359	CKSQYB471K50
	C267, C380	CKSQYB473K25
	C143	CKSQYB473K50
	C147, C263, C357, C362, C363	CKSQYB681K50
	C352, C353	CKSQYB682K50
	C265	CKSQYB823K25

Mark	No.	Description	Part No.
	C145, C199, C201, C202		CKSQYF103Z50
	C207, C208, C234, C240, C250		CKSQYF103Z50
	C301, C302		CKSQYF103Z50
	C101, C105, C109, C113, C121		CKSQYF104Z25
	C125, C129, C139, C151, C160		CKSQYF104Z25
	C198, C210, C211, C213		CKSQYF104Z25
	C218, C219, C225, C233, C242		CKSQYF104Z25
	C253, C273, C280, C283–C287		CKSQYF104Z25
	C294, C305, C308, C309, C311		CKSQYF104Z25
	C313, C317, C319, C324, C330		CKSQYF104Z25
	C334, C342, C345, C356, C369		CKSQYF104Z25
	C371, C372, C388, C393, C394		CKSQYF104Z25
	C114, C119, C122, C130, C132		CKSQYF105Z16
	C137		CKSQYF105Z16
	C205		RCH1152
RESISTORS			
	R127	(2.2kΩ)	PCN1039
	VR101–VR103, VR105, VR106	(4.7kΩ)	VCP1154
	VR104	(22kΩ)	VCP1158
	Other Resistors		RS1/10S□□□J
OTHERS			
	CN355	6P JUMPER CONNECTOR	52147-0610
	CN301	15P JUMPER CONNECTOR	52147-1510
	CN202	22P FFC CONNECTOR	9604S-22C
	CN302	KR CONNECTOR	B3B-PH-K-S
	CN352	KR CONNECTOR	B5B-PH-K-S
	CN351	5P TOP POST	B5P-SHF-1AA
	CN102, CN354	6P TOP POST	B6P-SHF-1AA
	JA301	OPTICAL RECEIVE MODULE	GP1F32R
	JA303	OPTICAL SEND MODULE	GP1F32T
	JA302	1P JACK (ORANGE)	PKB1027
	JA304	1P JACK (ORANGE)	PKB1028
	JA305	REMOTE CONTROL JACK	PKN1004
		PCB BINDER	VEF1040
	CN101	32P FFC CONNECTOR	VKN1463
	KN302, KN303		VNF1084
		EARTH METAL FITTING	
	X301	XTAL RESONATOR (16.9344MHz)	PSS1008
	X201	CERAMIC RESONATOR (32MHz)	PSS1023

E AUDIO ASSY

Although PWZ3934 and PWZ3933 are different in part number, they consist of the same components.

PARTS LIST FOR PWZ3933

SEMICONDUCTORS

Mark	No.	Description	Part No.
	IC801		AK5340-VS
	IC406		M5218AFP
	IC805, IC806		NJM4558MD
	IC803, IC804		NJM4565D-D
	IC404		NJM4580D
	IC401		PE8001A
	IC402		TC7SU04F
	Q405–Q408		2SC3068
	Q402		DTA114EK
	Q409		DTA114TK
	Q403		DTA124EK
	Q401, Q404		DTC124EK
	D401–D404		1SS133
	D407, D408		1SS355
	D406, D801, D803		DAN202K
	D405, D802, D804		DAP202K
COILS AND FILTERS			
	L328, L329, L402, L404		QTL1015
	L407, L408		QTL1015
		CHIP SOLID INDUCTOR	
	L401	FERRITE BEAD	VTH1020
CAPACITORS			
	C414, C415, C429, C430, C801		CCSQCH101J50
	C821		CCSQCH101J50
	C823, C824		CCSQCH120J50
	C803, C804		CCSQCH121J50
	C817, C818		CEAT100M50
	C813, C814, C844, C848		CEAT220M50
	C851, C852		CEAT220M50
	C441		CEAT4R7M50
	C421, C422, C425, C426		CEGA470M50
	C413		CKSQYB102K50
	C403		CKSQYB473K50
	C819, C820		CKSQYB821K50
	C454, C807–C810, C846		CKSQYF103Z50
	C855–C858		CKSQYF103Z50
	C815, C816, C831, C834, C836		CKSQYF104Z25
	C847, C883, C884		CKSQYF104Z25
	C404, C408, C409		CKSQYF104Z50
	C427, C428		CQMBA102J50
	C423, C424, C433, C434		CQMBA152J50
	C431, C432		CQMBA332J50
	C471, C472, C805, C806		PCH1124
	C811, C812, C833, C835	(47µF/50V)	PCH1124
	C406, C407, C832	(4.7µF/50V)	PCH1127
	C405, C410–C412	(220µF/25V)	PCH1128
RESISTORS			
	R475, R476		RD1/4PU102J
	R441–R444, R811, R812		RD1/4PU103J
	R817, R818		RD1/4PU103J
	R427, R428		RD1/4PU223J
	R435, R436		RD1/4PU271J
	R440, R807, R808		RD1/4PU272J
	R819, R820, R823, R824		RD1/4PU301J
	R429–R434, R448, R466		RD1/4PU471J
	R821, R822, R825, R826		RD1/4PU473J
	R411, R412		RDR1/2PM101J
	R413–R416		RN1/10SE1002D
	R853, R854		RN1/10SE1003D
	R855, R856		RN1/10SE3302D
	R801–R804		RS1/2LMF101J
	Other Resistors		RS1/10S□□□J
OTHERS			
	CN401	3P JUMPER CONNECTOR	52147-0310
	CN402	8P JUMPER CONNECTOR	52147-0810
	J801	JUMPER WIRE 15P	D20PYY1510E
	J810	6P CONNECTOR ASSY	PDE1301
	JA401, JA801	2P JACK	PKB1029

Mark	No.	Description	Part No.
		PCB BINDER	VEF1040
	KN111, KN112, KN114	EARTH METAL FITTING	VNF1084

F HEADPHONE ASSY

COILS AND FILTERS

Mark	No.	Description	Part No.
⚠	L461–L463	CHIP SOLID INDUCTOR	QTL1015

CAPACITORS

	C461, C463, C466		CCSQCH101J50
	C469		CGCYX104K25
	C462, C464, C465		CKSQYF103Z50

RESISTOR

	VR401	(500Ω-Bx2)	RCV1123

OTHERS

	CN403	3P JUMPER CONNECTOR	52147-0310
	403	HEADPHONE JACK	AKN-045
	KN401	EARTH METAL FITTING	VNF1084

G VR ASSY

RESISTORS

	VR801	(50KΩ-Ax2)	PCS1016
	Other Resistors		RS1/10S□□□J

H POWER ASSY

Although PWZ3938 and PWZ3937 are different in part number, they consist of the same components.

PARTS LIST FOR PWZ3937

SEMICONDUCTORS

⚠	IC21, IC24		BA05T
⚠	IC31		BA12T
⚠	IC22, IC23, IC25		ICP-N15
⚠	IC33		NJM7805FA
⚠	IC32		NJM79M12FA
⚠	D31–D34		10DF2FA9
⚠	D52		11ES2
⚠	D54		MTZJ18B
⚠	D11		S2VB20F

COILS AND FILTERS

	L11, L23	FERRITE BEAD	VTH1020
⚠	L1	FILTER	VTL1008

SWITCHES AND RELAYS

⚠	S1		RSA1001

CAPACITORS

⚠	C1–C3	(10000pF/AC250V)	ACG7020
	C21		CEAT103M16
	C11, C13		CFTLA123J50
	C31		CKSQYF102Z50
	C16, C17		CKSQYF103Z50
	C12		CKSQYF104Z50
	C15, C24		CKSQYF473Z50
	C32, C33		CQMA223J50
	C55, C56		CQMA273J50
	C42	(1000µF/16V)	PCH1122
	C52	(100µF/50V)	PCH1126
	C34, C35	(4.7µF/50V)	PCH1127
	C54	(220µF/25V)	PCH1128
	C23, C25	(470µF/50V)	PCH1129
	C36, C40	(3300µF/35V)	PCH1137
	C37, C41	(2200µF/35V)	PCH1138

RESISTORS

⚠	R38		RFA1/4PL8R2J
	R21		RS1/10S822J
	Other Resistors		RD1/4PU□□□J

OTHERS

		6P CABLE HOLDER	51048-0600
		8P CABLE HOLDER	51048-0800
	CN51	4P JUMPER CONNECTOR	52147-0410
⚠	H1, H2	FUSE CLIP	AKR1003
⚠	CN2	2P-VH CONNECTOR	B2P3-VH
	J21	JUMPER WIRE 6P	D20PYY0630G
	J31	JUMPER WIRE 8P	D20PYY0820G
	CN11	9P JUMPER CONNECTOR	KPD9
	J2	EARTH LEAD UNIT	PDF1168
⚠	CN1	AC INLET	PKP1012
		HEAT SINK	PNS1043
		PCB BINDER	VEF1040
	KN12, KN13	EARTH METAL FITTING	VNF1084

I TRANS ASSY

SEMICONDUCTORS

⚠	IC1		AEK7017

CAPACITORS

	C901–C909		CKSQYF104Z50

OTHERS

		9P CABLE HOLDER	51052-0900
⚠	J11	PARALLEL CORD	DTUY0915E
⚠	J1	CONNECTOR ASSY 2P	PDE1299
	J3	EARTH LEAD UNIT	PDF1176

J FUNCTION ASSY

SEMICONDUCTORS

	IC704		BU2092F
	IC701		PE5056B9
	IC702		S-806E
	Q705		2SC2412K
	Q701–Q704		DTA114EK
	Q706		DTC124TKA
	D709		1SS355
	D707, D708		GL3ED8
	D705, D706		SLP9118C51H

COILS AND FILTERS

	L701	CHIP SOLID INDUCTOR	QTL1015

Mark	No.	Description	Part No.
SWITCHES AND RELAYS			
	S720		PSB1008
	S702–S719		VSG1009
CAPACITORS			
	C701		CCSQCH101J50
	C743		CCSQCH470J50
	C705, C739		CEAT101M16
	C711, C712		CEAT470M16
	C702		CKSQYF103Z50
	C706, C708–C710		CKSQYF104Z25
RESISTORS			
	R710–R715		ACN7081
	R731		DCN1094
	Other Resistors		RS1/10S□□□J
OTHERS			
		5P CABLE HOLDER	51048-0500
	CN701	22P FFC CONNECTOR	9604S-22C
	J701	JUMPER WIRE 4P	D20PWY0425G
	J703	JUMPER WIRE 5P	D20PWY0515E
	J709	JUMPER WIRE 5P	D20PYY0555G
		REMOTE RECEIVER UNIT	GP1U27X
	V701	FL INDICATOR TUBE	PEL1097
	X701	CERAMIC RESONATOR (4.19MHz)	VSS1014

K INPUT ASSY

Although PWZ3930 and PWZ3929 are different in part number, they consist of the same components.

PARTS LIST FOR PWZ3929

Mark	No.	Description	Part No.
SEMICONDUCTORS			
	IC8001–IC8004, IC8101–IC8106		NJM4558MD
	IC3001		SN75157P
	Q3701–Q3708		2SA1037K
	Q8009, Q8010, Q8101, Q8102		2SC3068
	Q8001–Q8005, Q8103, Q8104		2SD2114K
	Q8006, Q8201		DTA124TK
	Q8202		DTC124EK
	Q8007		DTC124TKA
	D8001–D8006, D8101–D8104		1SS355
	D3701–D3708		DA204K
COILS AND FILTERS			
⚠	L3002, L3011–L3013, L3704–L3712		QTL1015
⚠	L8001–L8004		QTL1015
	L8009		QTL1015
⚠	L8021–L8025, L8027, L8029, L8030		QTL1015
⚠	L8101–L8106, L8109–L8112		QTL1015
⚠	L8201–L8205, L8231		QTL1015
SWITCHES AND RELAYS			
	RY8001,RY8002,RY8101,RY8102		RSR1029
	RY8003,RY8004		VSR1006

Mark	No.	Description	Part No.
CAPACITORS			
	C8111–C8114		CCSQCH101J50
	C3006		CCSQCH331J50
	C3002, C3003, C8101–C8104		CCSQCH470J50
	C8123, C8124, C8127, C8128		CCSQCH470J50
	C8011, C8012		CEAT101M25
	C8105–C8108		CEYANP101M25
	C8003–C8006		CEYANP220M25
	C3005, C3712–C3719		CKSQYF103Z50
	C3720		CKSQYF104Z25
	C3001, C3708, C8022, C8023		CKSQYF104Z50
	C8119–C8122		CKSQYF104Z50
	C8020, C8021		PCH1122
	C8007–C8010		PCH1124
	C3004, C3709, C8115–C8118		PCH1128
RESISTORS			
	R8089, R8090, R8105, R8106		RN1/10SE1002D
	R8113, R8114, R8119, R8120		RN1/10SE1002D
	R8123, R8124		RN1/10SE1002D
	R8011–R8014		RN1/10SE1003D
	R8157, R8158, R8167, R8168		RN1/10SE1201D
	R8117, R8118		RN1/10SE1202D
	R8007, R8008, R8107, R8108		RN1/10SE2701D
	R8149–R8152, R8159–R8162		RN1/10SE3000D
	R8169–R8172		RN1/10SE3000D
	R8017–R8020, R8109, R8110		RN1/10SE3602D
	R8005, R8006, R8009, R8010		RN1/10SE3901D
	R8101, R8102		RN1/10SE4700D
	R8103, R8104, R8125–R8140		RN1/10SE4702D
	R8153–R8156		RN1/10SE4702D
	R8015, R8016, R8021–R8026		RN1/10SE5601D
	R8115, R8116, R8121, R8122		RN1/10SE5601D
	Other Resistors		RS1/10S□□□J
OTHERS			
		3P CABLE HOLDER	51048-0300
	CN8006	5P JUMPER CONNECTOR	52147-0510
	CN8102	CONNECTOR POST	B2B-PH-K-S
	CN3002,CN8003	CONNECTOR POST	B3B-PH-K-S
	CN8101	CONNECTOR POST	B4B-PH-K-R
	J8005, J8006	3P JUMPER WIRE	D20PYY0310G
	JA3001,JA8001,JA8002	CONNECTOR	PKP1011
	JA8101,JA8102	CONNECTOR	PKP1013
	CN3702	DIN SOCKET 8P	RKN1030
		PCB BINDER	VEF1040

6. ADJUSTMENT

6.1 DISCS TO BE USED

1. When adjusting the servo system adjustment
   CD : Test disc for adjustment (STD-903 or equivalent)

6.2 MEASURING INSTRUMENTS

(1) Laser Power Meter
   Following power meter manufactured by Advantest Corporation
   TQ8210 + TQ82017,
   TQ8215 + TQ82021,
   TQ8215 + TQ82010 + TQ82017,
   Following power meter manufactured by Leader Corporation
   LE8010,
   or equivalent.
(2) Oscilloscope
(3) CD Jitter Meter

6.3 TEST MODE

6.3.1 Test Mode

For adjustment, set the unit to Test mode. To enter Test mode, turn on the unit with the Test Mode Short-Circuit pattern on the FUNCTION Assy. In Test mode, all the displays (FL, LEDs) on the unit should be lit. If not, turn the power off and repeat the same steps again.

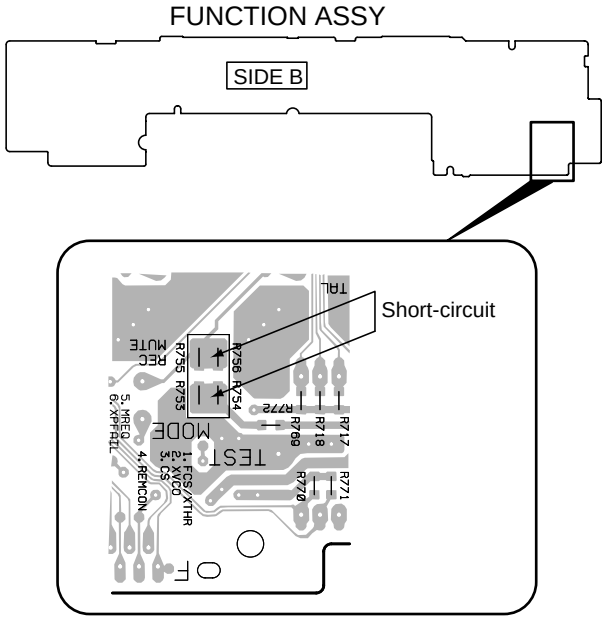


Fig. 1 Enter the Test mode

6.3.2 Operations in Test Mode

In Test mode, the following adjustment functions are assigned to the buttons, as explained below.

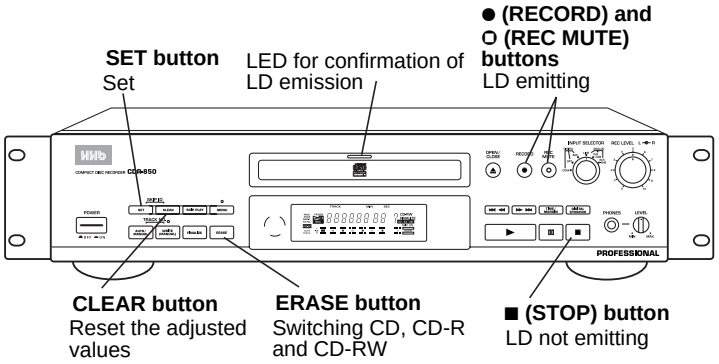


Fig.2 During adjustment of LD power (Input selector: AES/EBU)

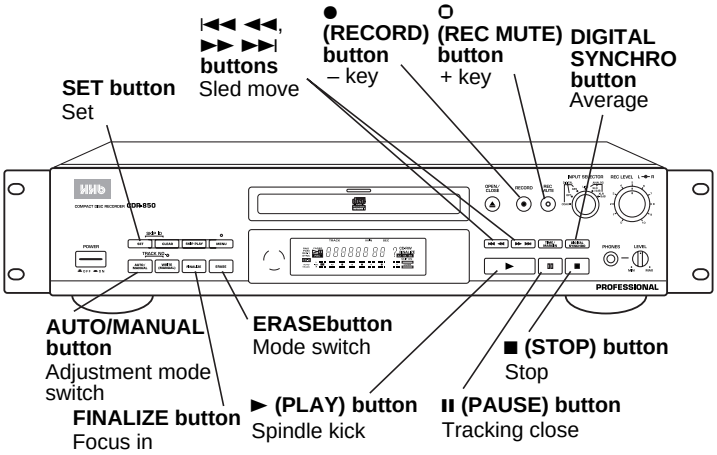


Fig.3 During adjustment of servo system (Input selector: optical)

6.3.3 How to Playback a Disc in Test Mode

In test mode, since the servos operate independently, playing back a disc requires that you operate the keys in the correct order to close the servos.
Here is the key operation sequence for playing back a disc in test mode.

FINALIZE	Lights up the laser diode and closes the focus servo.
⇩	
PLAY ►	Starts the spindle motor and closes the spindle servo.
⇩	
PAUSE II	Close the tracking servo.
⇩	

Wait at least 2 – 3 seconds between each of these operations.

6.4 ADJUSTMENT 1 (LASER DIODE POWER ADJUSTMENT)

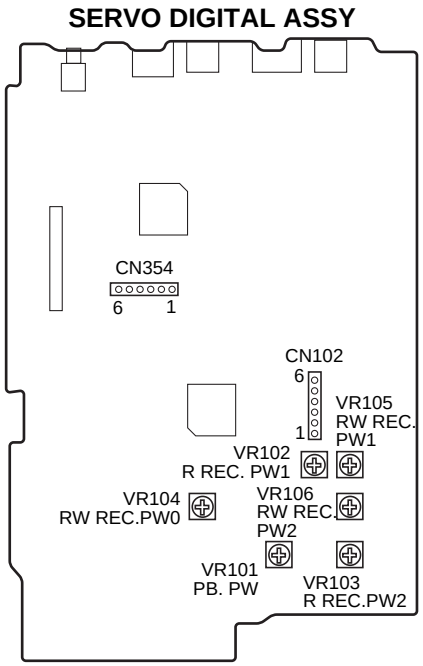


Fig. 4 Adjustment points

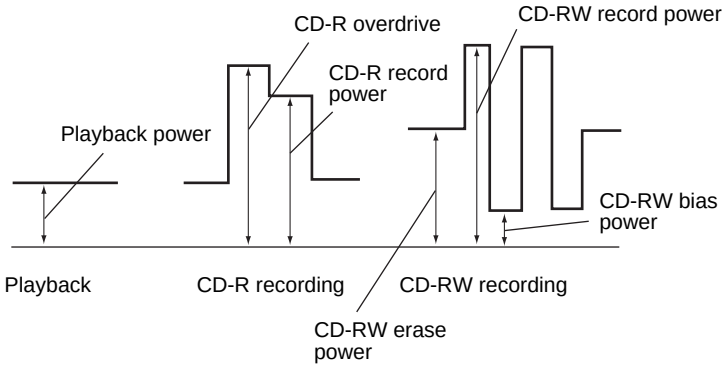
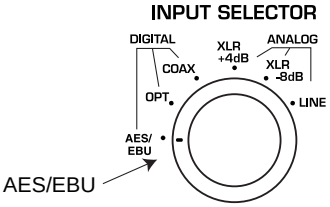


Fig.5 Output power of the laser diode

Note 1 : Attach the remote sensor of the laser power meter to a point angled away about 10 degrees against the pickup lens and where the maximum power is detected, so that there will be no light reflected onto the pickup.
Note 2 : When adjusting with VR101 to VR106, first turn them completely counter-clockwise and then adjust clockwise, so that the value to be reached is not exceeded.
Note 3 : Set the wavelength of laser power meter to 780 nm.

The following adjustments 1 through 3 must be done with the Input Selector set to the AES/EBU position (LD power adjustment mode).



DANGER – LASER RADIATION WHEN OPEN.
AVOID DIRECT EXPOSURE TO BEAM.

6.4.1 Playback Power Adjustment

Test Point	Pickup objective lens
Adjustment Point	VR101 (PB. PW)
Adjustment Value	0.60 mW ± 0.05 mW

[Procedure]

(1) Check that "CD" is displayed on the FL display. If "CD-R" or "CD-RW" is displayed, press the ERASE button repeatedly until "CD" is displayed.
(2) Press the RECORD button. The LED for confirmation of LD emission will light in green.
(3) Press the REC MUTE button. The LED for confirmation of LD emission will light in orange. The LD is emitting in this status.
(4) Turn VR101 clockwise until the adjustment value to be reached is obtained.
(5) Press the STOP button to shut off the LD.

DANGER – LASER RADIATION WHEN OPEN.
AVOID DIRECT EXPOSURE TO BEAM.

6.4.2 CD-R Record Power Adjustment

Test Point	Pickup objective lens
Adjustment Point	VR102 (R REC. PW1), VR103 (R REC. PW2)
Adjustment Value	VR102 : 4.60 mW ± 0.1 mW VR103 : Addition of 0.1 mW ± 0.01 mW to the adjustment value of VR102

[Procedure]

(1) Turn VR102 and VR103 completely counterclockwise to set their power output to minimum.
(2) Press the ERASE button once so that "CD-R" appears on the FL display.
If the indication is "CD" or "CD-RW," press the ERASE button repeatedly until "CD-R" is displayed on the FL display.
(3) Press the RECORD button. The LED for confirmation of LD emission will light in green.
(4) Press the REC MUTE button. The LED for confirmation of LD emission will light in red. The LD is emitting in this status.

Adjustment of CD-R record power

(5) Turn VR102 clockwise until the adjusted value is 4.60 mW ± 0.1 mW.

Adjustment of CD-R overdrive power

(6) Turn VR103 clockwise until the adjusted value becomes adjustment value at Step 5 above + (0.1 mW ± 0.01 mW).
(7) Press the STOP button to shut off the LD.

DANGER – LASER RADIATION WHEN OPEN.
AVOID DIRECT EXPOSURE TO BEAM.

6.4.3 CD-RW Record Power Adjustment

Test Point	Pickup objective lens
Adjustment Point	VR104 (RW REC. PW0), VR106 (RW REC. PW2), VR105 (RW REC. PW1)
Adjustment Value	VR104 : 0.40 mW ± 0.05 mW * Serial No. 1-19 (MY Type), 1-27 (KU/CA Type) VR106 : 2.0 mW ± 0.1 mW * VR106 : 2.4 mW ± 0.1 mW VR105 : 5.7 mW ± 0.1 mW * VR105 : 5.9 mW ± 0.1 mW

[Procedure]

(1) Turn VR104, VR105 and VR106 completely counterclockwise to set their power output to minimum.
(2) Press the ERASE button twice so that "CD-RW" appears on the FL display.
If the indication is "CD" or "CD-R," press the ERASE button repeatedly until "CD-RW" appears on the FL display.
(3) Press the RECORD button. The LED for confirmation of LD emission will light in green.
(4) Press the REC MUTE button. The LED for confirmation of LD emission will light in red. The LD is emitting in this status.
(5) Turn VR104 clockwise until the adjusted value is 0.40 mW ± 0.05 mW.

Adjustment of CD-RW record power

(6) Turn VR106 clockwise until the adjusted value is 2.0 mW ± 0.1 mW. * Serial No. 1-19 (MY Type), 1-27 (KU/CA Type) 2.4 mW ± 0.1 mW

Adjustment of CD-RW erase power

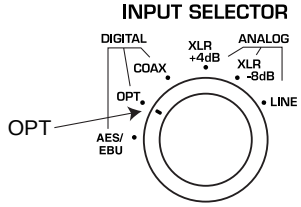
(7) Turn VR105 clockwise until the adjusted value is 5.7 mW ± 0.1 mW. * Serial No. 1-19 (MY Type), 1-27 (KU/CA Type) 5.9 mW ± 0.1 mW
(8) Press the STOP button to shut off the LD.

* CD-RW Record power adjustment value is different according to the part number used for IC316.

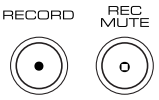
IC316	PDK033A	PDK041A
VR106	2.4 mW	2.0 mW
VR105	5.9 mW	5.7 mW
Serial No.	1-19 (MY Type) 1-27 (KU/CA Type)	20- (MY Type) 28- (KU/CA Type)

6.5 ADJUSTMENT 2 (SERVO SYSTEM ADJUSTMENT)

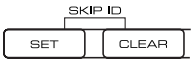
For servo adjustment, set the INPUT SELECTOR to OPTICAL.



Use the RECORD and REC MUTE buttons to make the adjustments.



To register an adjustment, press the (SKIP ID) SET button.



To reset the adjusted values to the initial settings, press and hold the (SKIP ID) CLEAR button for 4 seconds.

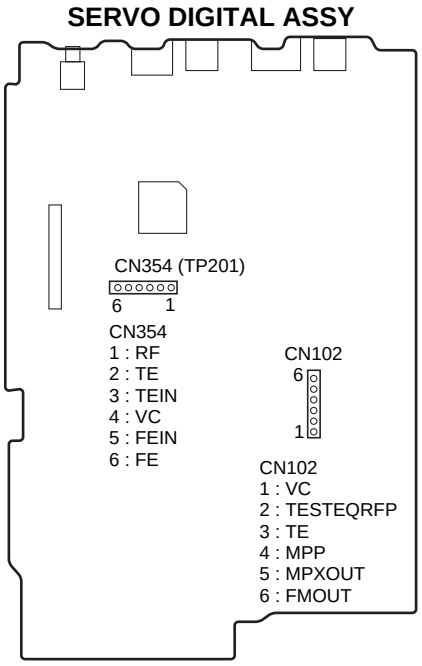


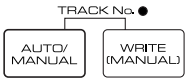
Fig. 6 Adjustment points

6.5.1 Focus Offset Adjustment

Test Point	CN354 - pin 6 (FE)
Adjustment Point	RECORD button and REC MUTE button
Adjustment Value	0 mV ± 10 mV

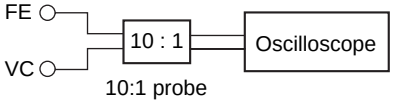
[Procedure]

(1) Press the AUTO/MANUAL button until "01 F4" appears on the FL display.



(2) Adjust with the RECORD and REC MUTE buttons until the value for Pin 6 of CN354 is 0 mV ± 10 mV.

(3) Press the SET button to register the adjustment.
Once the adjustment is registered with the SET button, "?" on the FL display will disappear.



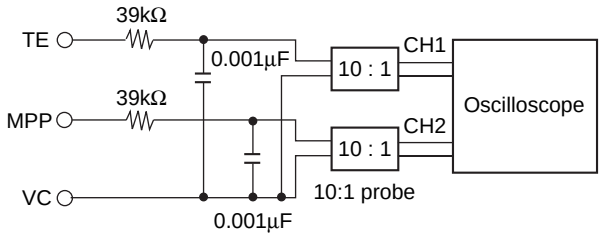
6.5.2 M-S Mix Ratio Adjustment

Test Point	CN102 - pin 3 (TE) and pin 4 (MPP)
Adjustment Point	RECORD button and REC MUTE button
Adjustment Value	Adjust until the value of the output signals from pin 3 (TE) and pin 4 (MPP) of CN102 are the same, or the differential output of these signals is minimal.

[Procedure]

(1) Press the AUTO/MANUAL button so that "02 F3" appears on the FL display.
(2) Press the FINALIZE button for focus-in.
(3) Press the PLAY button for CAV-servo spindle kick (the status where the spindle rotates with the focus servo on and tracking servo off).
(4) Adjust with the RECORD and REC MUTE buttons until the value to be reached is obtained.
(5) Press the SET button to register the adjustment.
Once the adjustment is registered with the SET button, "?" on the FL display will disappear.
(6) Press the STOP button to stop the unit.

Note: For adjustment, use the following circuits.



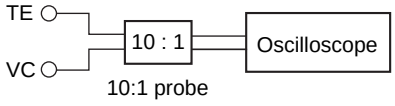
Note: Adjustment must be done around mid-radius on a disc.

6.5.3 Tracking Offset Adjustment

Test Point	CN354 - pin 2 (TE) or CN102-pin 3 (TE)
Adjustment Point	RECORD button and REC MUTE button
Adjustment Value	0 mV ± 10 mV

[Procedure]

(1) Press the AUTO/MANUAL button so that "03 F6" appears on the FL display.
(2) Adjust with the RECORD and REC MUTE buttons until the above adjustment value to be reached is obtained.
(3) Press the SET button to register the adjustment.
Once the adjustment is registered with the SET button, "?" on the FL display will disappear.



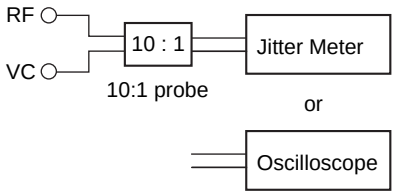
Note: Perform the adjustment in Stop mode.
This adjustment is possible with the low-pass filter used in adjustment 5 above attached.

6.5.4 Focus Bias Adjustment

Test Point	CN354 - pin 1 (RF)
Adjustment Point	DIGITAL SYNCHRO button, RECORD button and REC MUTE button
Adjustment Value	Adjust until RF jitter is minimal or that the eye pattern of the RF waveform is most open.

[Procedure]

(1) Press the DIGITAL SYNCHRO button in Stop mode.
Note: Make sure the unit is in Stop mode.
(2) Check that "48" appears on the FL display.
(3) Press the AUTO/MANUAL button so that "04 34" appears on the FL display.
(4) Press the FINALIZE button for focus-in.
(5) Press the PLAY button for CAV-servo spindle kick.
(6) Press the PAUSE button to close the tracking servo, then set the unit to Playback mode.
(7) Adjust with the RECORD and REC MUTE buttons until the above adjustment value to be reached is obtained.
Press the SET button to register the adjustment. Once the adjustment is registered with the SET button, "?" on the FL display will disappear.
(8) Press the STOP button to stop the unit.



Note: Adjustment must be done around mid-radius on a disc.

7. GENERAL INFORMATION

7.1 PARTS

7.1.1 IC

• The information shown in the list is basic information and may not correspond exactly to that shown in the schematic diagrams.

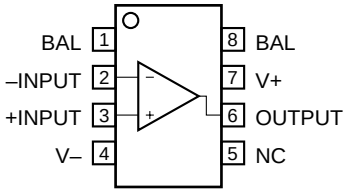
● List of IC

NJM2136M, MC34072D, AK8563, BA7082F, AD1893JST, BA5912AFP-Y, BA5932FP, CXD2585Q, TK11041M-1, S-806E, PE8001A, PE5056A, PE5073A, PDJ014A

■ NJM2136M (SERVO DIGITAL ASSY : IC101)

• Operational Amplifier

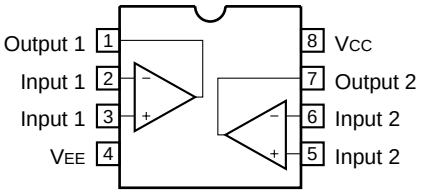
●Block Diagram



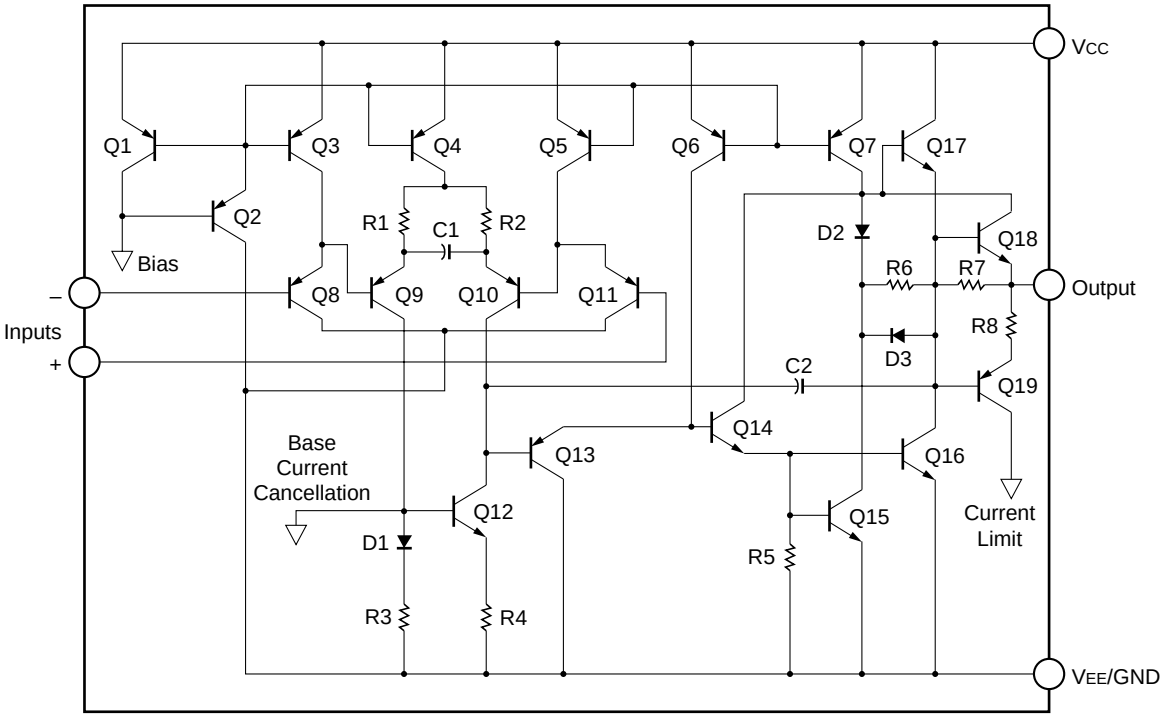
■ MC34072D (SERVO DIGITAL ASSY : IC102)

• Operational Amplifier

● Pin Assignment



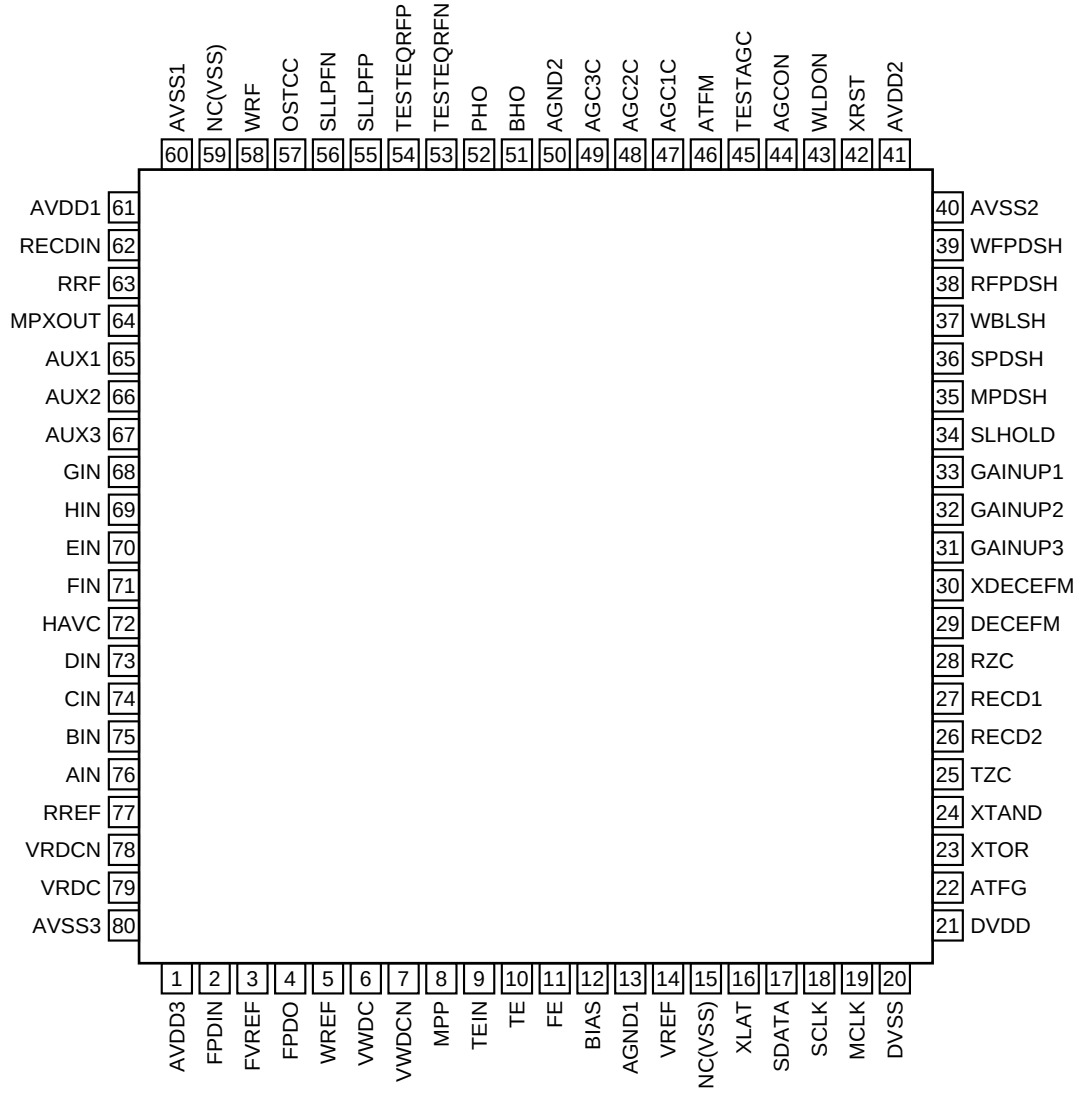
● Block Diagram



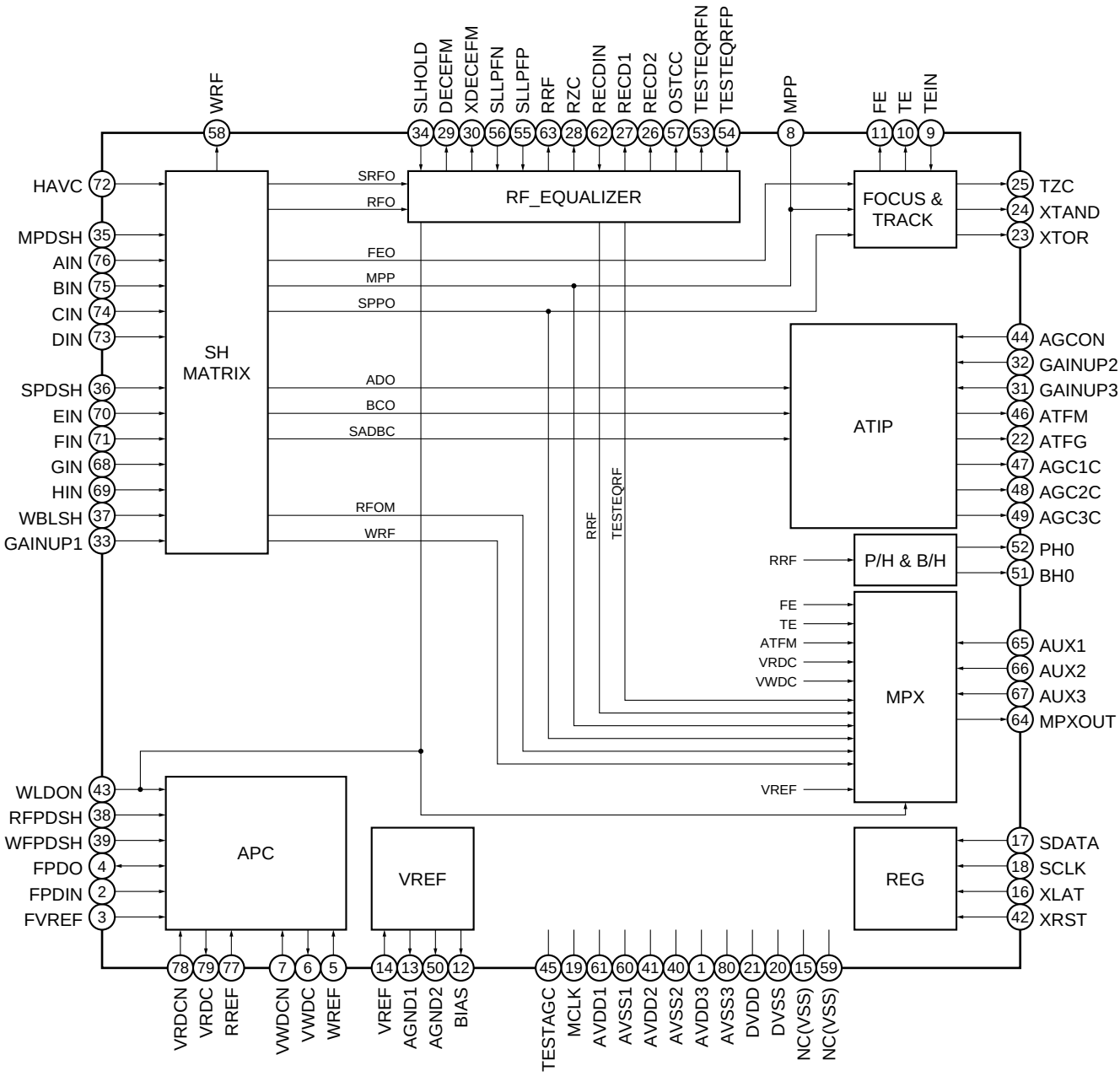
AK8563 (SERVO DIGITAL ASSY : IC103)

- **RF Processor IC**

- **Pin Assignment (Top view)**



● Block Diagram



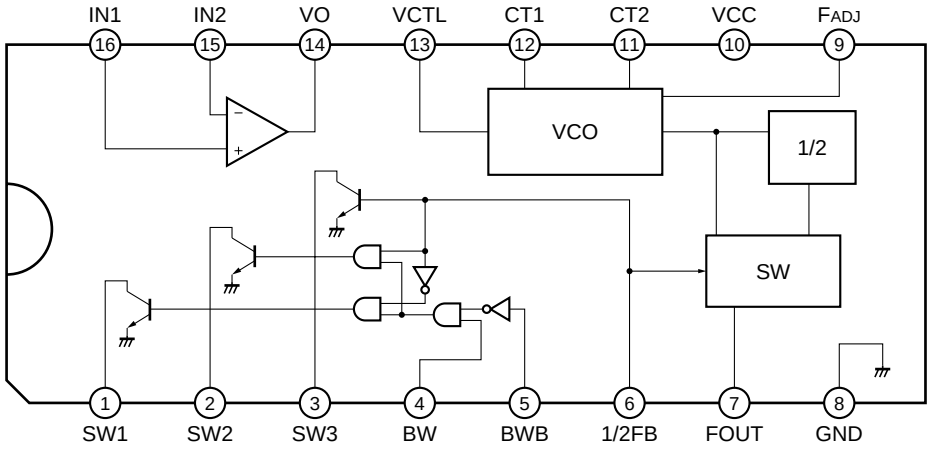
● Pin Function

No.	Pin Name	I/O	Function	No.	Pin Name	I/O	Function
1	AVDD3	I	Analog positive power supply pin	41	AVDD2	I	Analog positive power supply pin
2	FPDIN	I	Laser monitor diode connection pin	42	XRST	I	Register reset "L": Initialize the register
3	FVREF	I	Reference voltage input for APC	43	WLDON	I	Write LD control input "L": Set Write APC set-value to zero, "H": LD ON
4	FPD0	I/O	Laser monitor output (connect a resistor for I/V conversion between this pin and FPDIN (pin 2)) / Laser monitor voltage input	44	AGCON	I	Wobble AGC enable input "H": AGC ON , "L": AGC reset
5	WREF	I	Power setting voltage input for Write APC	45	TESTAGC	O	Test pin
6	VWDC	O	Laser driver control output for Write	46	ATFM	O	Wobble signal output
7	VWDCN	I	Laser driver control amp.(–) for Write	47	AGC1C	O	External capacitor connection pin for AGC response speed setting
8	MPP	O	Main push-pull signal output	48	AGC2C	O	
9	TEIN	I	Input for tracking signal process	49	AGC3C	O	
10	TE	O	Tracking error signal output	50	AGND2	O	Decoupling pin for internal reference voltage
11	FE	O	Focus error signal output	51	BH0	O	Bottom-level output of RRF signal
12	BIAS	O	Connect a bias resistor. RBIAS=4.7kΩ	52	PH0	O	Peak-level output of RRF signal
13	AGND1	O	Decoupling pin for internal reference voltage	53	TESTEQRFN	O	Test pin
14	VREF	I/O	Decoupling pin for internal reference voltage / Reference voltage input	54	TESTEQRFP	O	Test pin
15	NC (VSS)	–	Connect to VSS	55	SLLPFP	I	LPF input (+) for auto slice
16	XLAT	I	Latch input for register setting	56	SLLPFN	I	LPF input (–) for auto slice
17	SDATA	I	Data input for register setting	57	OSTCC	O	Capacitor connection pin for fc setting of equalizer output offset-canceller
18	SCLK	I	Clock input for register setting	58	WRF	O	Write RF signal output
19	MCLK	I	Main clock input (34.5744MHz)	59	NC (VSS)	–	Connect to VSS
20	DVSS	I	Digital ground pin	60	AVSS1	O	Analog ground pin
21	DVDD	I	Digital positive power supply pin	61	AVDD1	I	Analog positive power supply pin
22	ATFG	O	ATIP FG output (Wobble signal after the binary data conversion)	62	RECDIN	I	RF input for recording block detection
23	XTOR	O	Tracking amplitude detection output	63	RRF	O	Read RF signal output
24	XTAND	O	Tracking error detection output	64	MPXOUT	O	Multiplexer output for signal monitor
25	TZC	O	Tracking zero-cross detection signal output	65	AUX1	I	Auxiliary input (1) for signal monitor
26	RECD2	O	Recording block detection signal 2 "H": Recording block , "L": Unrecording block	66	AUX2	I	Auxiliary input (2) for signal monitor
27	RECD1	O	Recording block detection signal 1 "H": Recording block , "L": Unrecording block	67	AUX3	I	Auxiliary input (3) for signal monitor
28	RZC	O	RF zero-cross detection signal output	68	GIN	I	Side beam signal (G) input
29	DECEFM	O	EFM output after sliced (inversion)	69	HIN	I	Side beam signal (H) input
30	XDECEFM	O	EFM output after sliced (positive-phase)	70	EIN	I	Side beam signal (E) input
31	GAINUP3	I	0 and +18dB switching control input "H": +18dB, "L": 0dB	71	FIN	I	Side beam signal (F) input
32	GAINUP2	I		72	HAVC	I	Center voltage input of main and side beam signals
33	GAINUP1	I		73	DIN	I	Main beam signal (D) input
34	SLHOLD	I	Slice level hold signal input "H": Hold	74	CIN	I	Main beam signal (C) input
35	MPDSH	I	Sample pulse input for main-beam "H": Sample , "L": Hold	75	BIN	I	Main beam signal (B) input
36	SPDSH	I	Sample pulse input for side-beam "H": Sample , "L": Hold	76	AIN	I	Main beam signal (A) input
37	WBLSH	I	Sample pulse input for Wobble signal "H": Sample , "L": Hold	77	RREF	I	Power setting voltage input for Read APC
38	RFPDSH	I	Sample pulse input for Read APC "H": Sample , "L": Hold	78	VRDCN	I	Laser driver control amp. (–) for Read
39	WFPDSH	I	Sample pulse input for Write APC "H": Sample , "L": Hold	79	VRDC	O	Laser driver control output for Read
40	AVSS2	I	Analog ground pin	80	AVSS3	I	Analog ground pin

■ BA7082F (SERVO DIGITAL ASSY : IC302)

• VCO IC

● Block Diagram



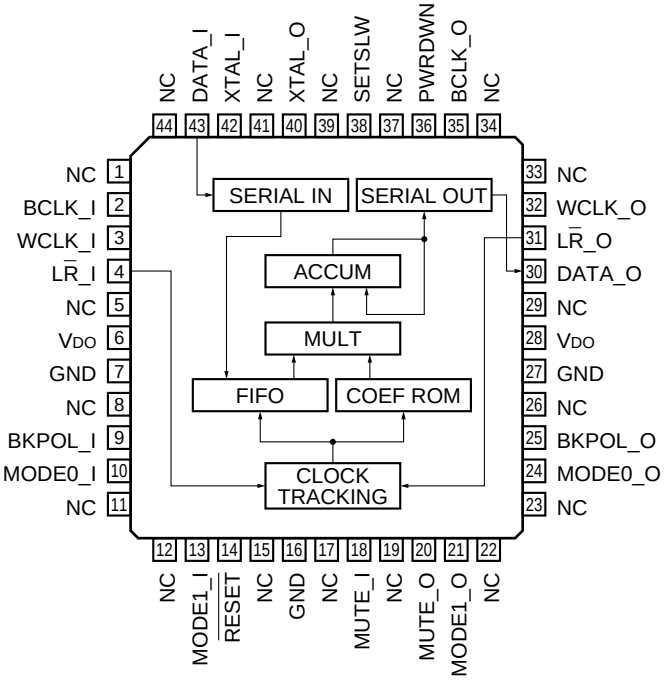
● Pin Function

No.	Pin Name	I/O	Function	No.	Pin Name	I/O	Function
1	SW1	O	Collector open output Logic block output for control sensibility adjustment	9	FADJ	–	f0 Adjust pin
2	SW2			10	VCC	–	VCC pin
3	SW3			11	CT2	–	Capacitor connection pin for VCO oscillation
4	BW	I	Logic block input for control sensibility adjustment	12	CT1		
5	BWB			13	VCTL	I	VCO control pin Normally, use for short-circuit with VO (pin 14).
6	1/2FB	I	Logic block input for control sensibility adjustment and 1/2 frequency demultiplier switch H: through , L: 1/2 frequency demultiplier output	14	V0	O	Amp. output for sensibility adjustment
7	FOUT	O	VCO output pin	15	IN2	I	Amp. input for sensibility adjustment IN1: positive-phase input IN2: Inverting input
8	GND	–	GND pin	16	IN1		

■ AD1893JST (SERVO DIGITAL ASSY : IC311)

• Sample Rate Converter IC

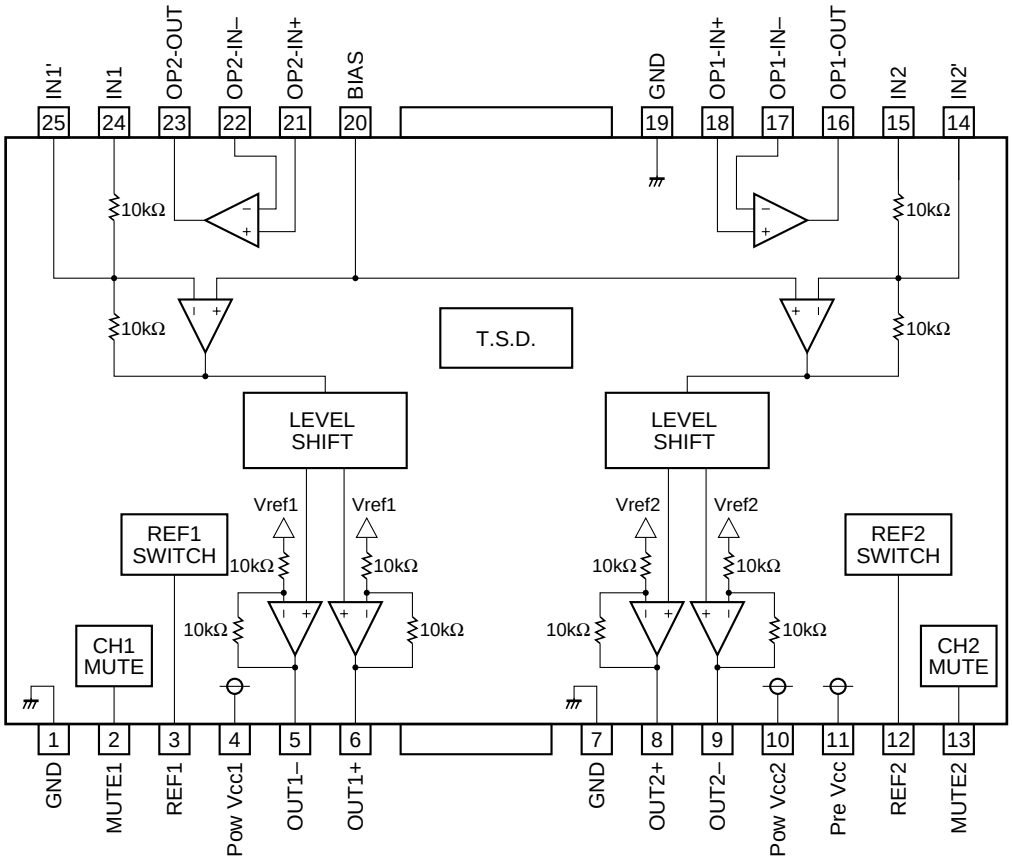
● Block Diagram



■ BA5912AFP-Y (SERVO DIGITAL ASSY : IC351)

• **Driver IC**

● **Block Diagram**



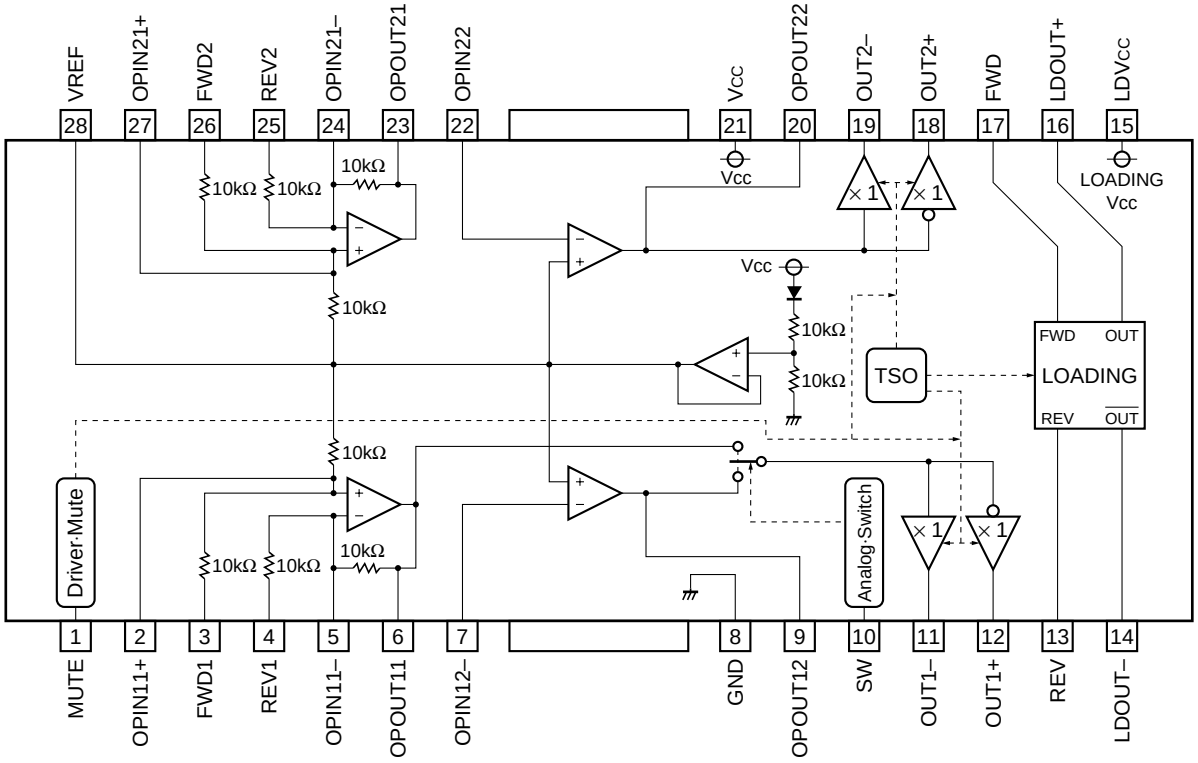
● **Pin Function**

No.	Pin Name	Function	No.	Pin Name	Function
1	GND	Sub-straight GND	14	IN2'	CH2 input pin for gain adjustment
2	MUTE1	CH1 mute pin	15	IN2	CH2 gain fixed input
3	REF1	CH1 Vref switching pin	16	OP1-OUT	OP amp. 1 output
4	Pow Vcc1	Pow Vcc (CH1)	17	OP1-IN–	OP amp. 1 – input
5	OUT1–	CH1 negative output	18	OP1-IN+	OP amp. 1 + input
6	OUT1+	CH1 positive output	19	GND	Sub-straight GND
7	GND	Sub-straight GND	20	BIAS	Bias input
8	OUT2+	CH2 positive output	21	OP2-IN+	OP amp. 2 + input
9	OUT2–	CH2 negative output	22	OP2-IN–	OP amp. 2 – input
10	Pow Vcc2	Pow Vcc (CH2)	23	OP2-OUT	OP amp. 2 output
11	Pre Vcc	Pre Vcc	24	IN1	CH1 gain fixed input
12	REF2	CH2 Vref switching pin	25	IN1'	CH1 input pin for gain adjustment
13	MUTE2	CH2 mute pin			

■ BA5932FP (SERVO DIGITAL ASSY : IC352)

• **Driver IC**

● **Block Diagram**



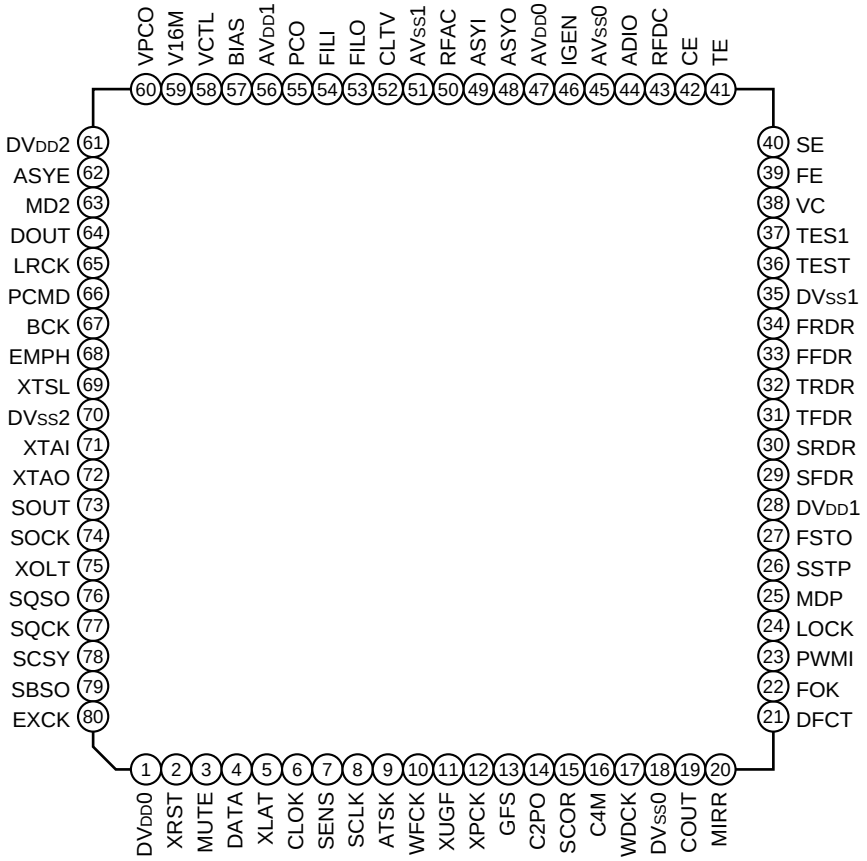
● **Pin Function**

No.	Pin Name	Function	No.	Pin Name	Function
1	MUTE	Mute pin	15	LDVcc	Vcc for loading and output H bridge section
2	OPIN11+	OP amp. non-inverting input	16	LDOUT+	Loading positive output
3	FWD1	Forward input	17	FWD	Loading forward input
4	REV1	Reverse input	18	OUT2+	Driver output
5	OPIN11–	OP amp. inverting input	19	OUT2–	Driver output
6	OPOUT11	OP amp. output	20	OPOUT22	OP amp. output
7	OPIN12–	OP amp. inverting input	21	Vcc	Vcc for two axes driver and loading pre section
8	GND	Sub-straight GND	22	OPIN22	OP amp. inverting input
9	OPOUT12	OP amp. output	23	OPOUT21	OP amp. output
10	SW	Analog switch input	24	OPIN21–	OP amp. inverting input
11	OUT1–	Driver output	25	REV2	Reverse input
12	OUT1+	Driver output	26	FWD2	Forward input
13	REV	Loading reverse input	27	OPIN21+	OP amp. non-inverting input
14	LDOUT–	Loading negative output	28	VREF	Reference voltage output

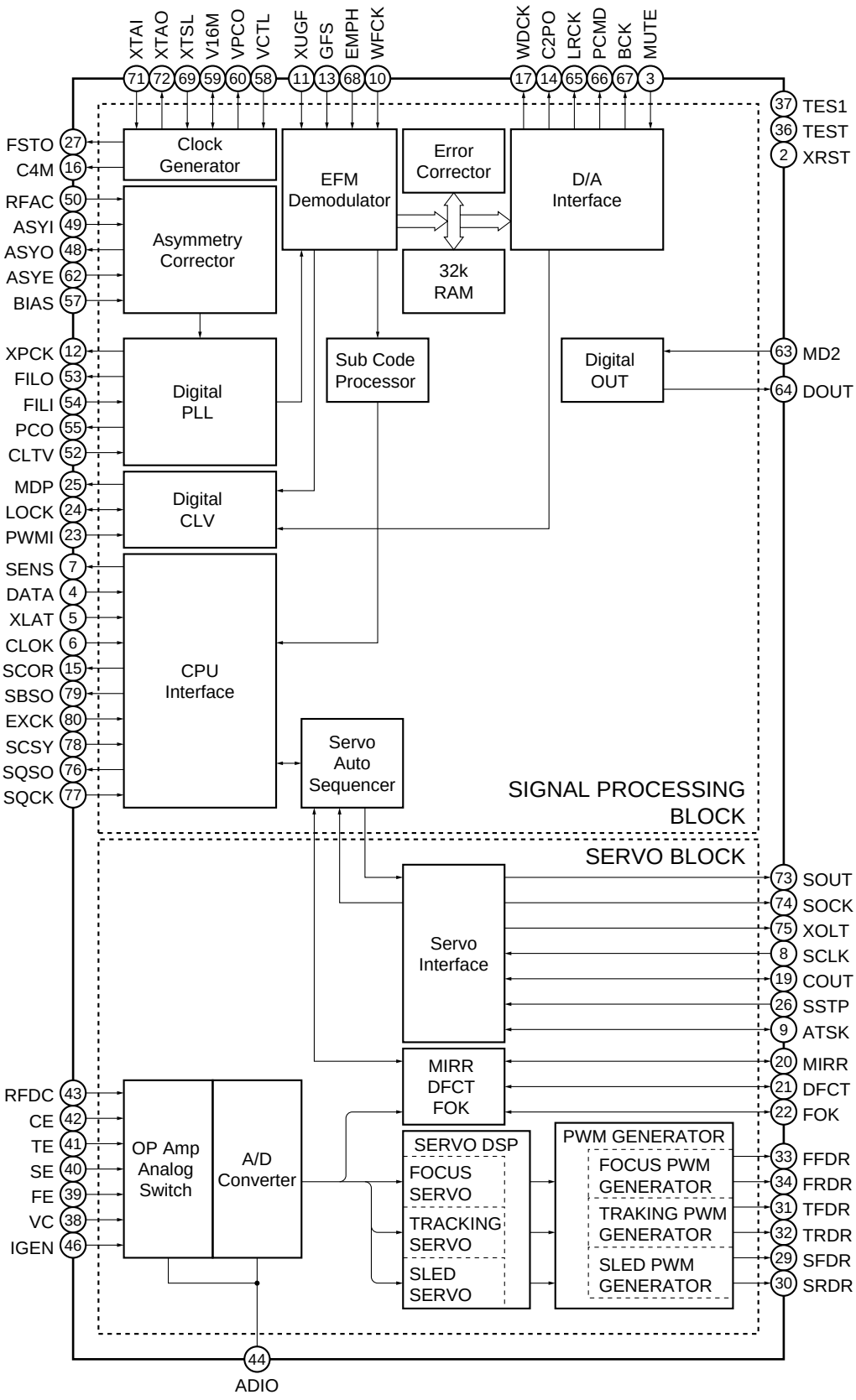
■ CXD2585Q (SERVO DIGITAL ASSY : IC353)

• Digital Signal Processor IC

● Pin Assignment (Top view)



● Block Diagram



CDR-850

● Pin Function

No.	Pin Name	I/O	Function	No.	Pin Name	I/O	Function
1	DVDD0	–	Digital power supply	41	TE	I	Tracking error input
2	XRST	I	System reset Reset when "L"	42	CE	I	Center servo analog input
3	MUTE	I	Mute input Mute when "H"	43	RFDC	I	RF signal input
4	DATA	I	Serial data input from CPU	44	ADIO	O	Test pin Non connection
5	XLAT	I	Latch input from CPU Serial data is latched at the falling edge.	45	AVSS0	–	Analog GND
6	CLOK	I	Serial data transfer clock input from CPU	46	IGEN	I	Constant current input for OP amplifier
7	SENS	O	SENS output to CPU	47	AVDD0	–	Analog power supply
8	SCLK	I	Clock input for SENS serial-data readout	48	ASYO	O	EFM full-swing output ("L"=VSS, "H"=VDD)
9	ATSK	I/O	Input and output for unti-shock	49	ASYI	I	Asymmetry comparate voltage input
10	WFCK	O	WFCK output	50	RFAC	I	EFM signal input
11	XUGF	O	XUGF output MNT0 and RFCK output by switching the command.	51	AVSS1	–	Analog GND
12	XPCK	O	XPCK output MNT1 output by switching the command.	52	CLTV	I	VCO 1 control voltage input for gradual increase
13	GFS	O	GFS output MNT2 and XROF output by switching the command.	53	FILO	O	Filter output for master PLL (Slave=digital PLL)
14	C2PO	O	C2PO output MNT3 and GTOP output by switching the command.	54	FILI	I	Filter input for master PLL
15	SCOR	O	Outputs "H" when either subcode sync. S0 or S1 is detected.	55	PCO	O	Charge pump output for master PLL
16	C4M	O	4.2336MHz output Outputs 1/4 frequency demultiply of V16M in the CAV-W mode and variable pitch.	56	AVDD1	–	Analog power supply
17	WDCK	O	Word clock output f=2Fs Outputs GRSCOR by command switch	57	BIAS	I	Constant current input of asymmetry circuit
18	DVSS0	–	Digital GND	58	VCTL	I	VCO2 control voltage input for wide-band EFM PLL
19	COUT	I/O	Input and output of track-number count signal	59	V16M	I/O	VCO2 oscillation output for wide-band EFM PLL Clock input for wide-band EFM-PLL by command switch
20	MIRR	I/O	Mirror signal input and output	60	VPCO	O	Charge pump output for wide-band EFM PLL
21	DFCT	I/O	Defect signal input and output	61	DVDD2	–	Digital power supply
22	FOK	I/O	Focus OK signal input and output	62	ASYE	I	Asymmetry circuit ON/OFF control (L:OFF, H:ON)
23	PWMI	I	External control input of spindle motor	63	MD2	I	Digital out ON/OFF control (L:OFF, H:ON)
24	LOCK	I/O	GFS is sampled at 460Hz;when GFS is "H", this pin outputs "H". If GFS is "L" eight consecutive samples, this pin outputs "L". Input when LKIN="1".	64	DOUT	O	Digital out output
25	MDP	O	Servo control output of spindle motor	65	LRCK	O	D/A interface LR clock output f=Fs
26	SSTP	I	Detection signal input of disc innermost	66	PCMD	O	D/A interface Serial data output (2's COMP, MSB first)
27	FSTO	O	Outputs 2/3 frequency demultiply of XTAL pin	67	BCK	O	D/A interface Bit clock output
28	DVDD1	–	Digital power supply	68	EMPH	O	Outputs "H" when the playback disc has emphasis, and "L" when there is no emphasis.
29	SFDR	O	Sled drive output	69	XTSL	I	X'tal selection input 16.9344MHz: L, 33.8688MHz: H
30	SRDR	O		70	DVSS2	–	Digital GND
31	TFDR	O	Tracking drive output	71	XTAI	I	Crystal oscillation circuit input Input the external master clock via this pin.
32	TRDR	O		72	XTAO	O	Crystal oscillation circuit output
33	FFDR	O	Focus drive output	73	SOUT	O	Serial data output in the servo block
34	FRDR	O		74	SOCK	O	Serial data readout clock output in the servo block
35	DVSS1	–	Digital GND	75	XOLT	O	Serial data latch output in the servo block
36	TEST	I	TEST pin : normally GND	76	SQSO	O	SubQ 80-bit, PCM peak and level data output CD TEXT data output
37	TES1	I		77	SQCK	I	Clock input for SQSO readout
38	VC	I	Center voltage input	78	SCSY	I	Input for resynchronous of GRSCOR
39	FE	I	Focus error signal input	79	SBSO	O	Serial output of Sub P to W
40	SE	I	Sled error signal input	80	EXCK	I	Clock input for SBSO readout

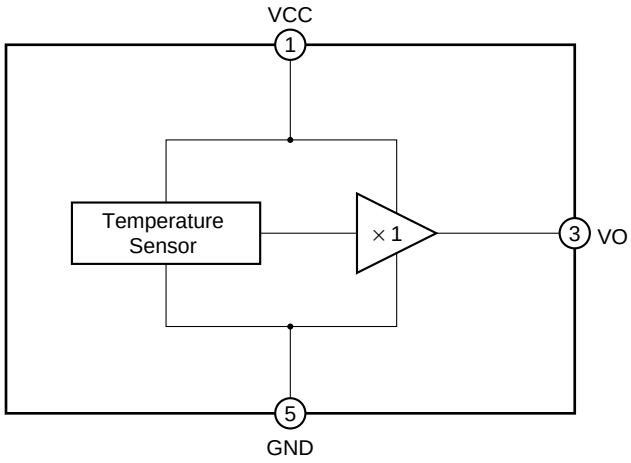
Notes)

- PCMD is an MSB first. two's complement output.
- GTOP is used to monitor the frame sync protection status. (High:sync protection window released)
- XUGF is the negative pulse for the frame sync derived from the EFM signal. It is the signal before sync protection.
- XPCK is the inverse of the EFM PLL clock. The PLL is designed so that the falling edge of XPCK and the EFM signal transition point coincide.
- GFS goes high when the frame sync and the insertion protection timing match.
- RFCK is derived with the crystal accuracy. This signal has a cycle of 136µs.
- C2PO represents the data error status.
- XROF is generated when the 32K RAM exceeds the ±28 Frame jitter margin.

■ TK11041M-1 (SERVO DIGITAL ASSY : IC355)

• **Thermo Sensor IC**

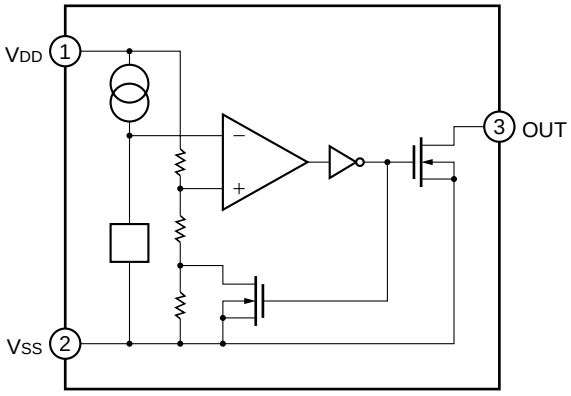
● **Block Diagram**



■ S-806E (FUNCTION ASSY : IC702)

• **Voltage Detector IC**

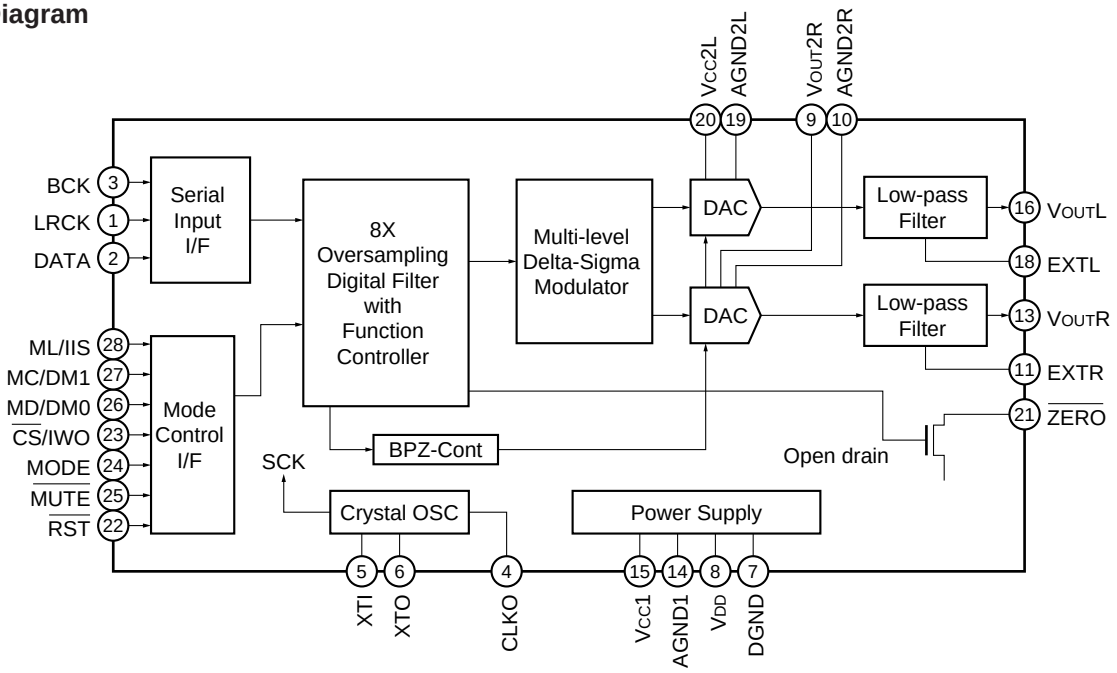
● **Block Diagram**



■ PE8001A (AUDIO ASSY : IC401)

• D/A Converter IC

● Block Diagram



● Pin Function

No.	Pin Name	I/O	Function	No.	Pin Name	I/O	Function
1	LRCK	I	LRCK clock input (fs) ∗1	15	VCC1	–	Analog power supply +5V
2	DATA	I	Data input ∗1	16	VOUTL	O	L ch analog voltage output
3	BCK	I	Bit clock input for data ∗1	17	NC	–	Non connection
4	CLKO	O	Buffer output of system clock	18	EXTL	O	L ch analog output amp. common
5	XTI	I	Crystal oscillation connection or external clock input	19	AGND2L	–	Analog GND
6	XTO	O	Crystal oscillation connection	20	VCC2L	–	Analog power supply +5V
7	DGND	–	Digital GND	21	$\overline{\text{ZERO}}$	O	Zero data flag
8	VDD	–	Digital power supply +5V	22	$\overline{\text{RST}}$	I	Reset ∗2
9	VCC2R	–	Analog power supply +5V	23	$\overline{\text{CS}}$/IWO	I	Chip select / Input format select ∗3
10	AGND2R	–	Analog GND	24	MODE	I	Mode control select ∗2 (H: Software, L: Hardware)
11	EXTR	O	R ch analog output amp. common	25	$\overline{\text{MUTE}}$	I	Mute control ∗2
12	NC	–	Non connection	26	MD/DM0	I	Mode control data / deemphasis select 1 ∗2
13	VOUTR	O	R ch analog voltage output	27	MC/DM1	I	Mode control BCK / deemphasis select 2 ∗2
14	AGND1	–	Analog GND	28	ML/IIS	I	Mode control latch / Input format select ∗2

Note :

∗1 : Schmitt trigger input

∗2 : Schmitt trigger input with pull-up resistor

∗3 : Schmitt trigger input with pull-down resistor

■ PE5056A (FUNCTION ASSY : IC701) • Mode Control Microcomputer

● Pin Function

No.	Port	Pin Name	I/O	Int	Function	No.	Port	Pin Name	I/O	Int	Function
1	FIP6	GLID6	O	L	FL grid out put 5	41	P32	MACK	O	H	Communication response for mechanism controller (L from H : Communication permission) (H from L : Communication end)
2	FIP5	GLID5	O	L	FL grid out put 6	42	P31	LREQ	O	H	CE signal for LC89585 (L : ENABLE)
3	FIP4	GLID4	O	L	FL grid out put 7	43	P30	UNLOCK	I		Digital unlock detection
4	FIP3	GLID3	O	L	FL grid out put 8	44	INTP3	ROT_INT	I		Operation detection of rotary encoder switch (Interrupt)
5	FIP2	GLID2	O	L	FL grid out put 9	45	INTP2	XPFAIL	I		POWER DOWN detection (L : POWER DOWN)
6	FIP1	GLID1	O	L	FL grid out put 10	46	INTP1	MREQ	I		Mechanism controller communication request (Interrupt)
7	FIP0	GLID0	O	L	FL grid out put 11	47	INTP0	REMIN	I		Remote control input (Interrupt)
8	VDD		O		Connected to VDD	48	IC	VPP	I		Connected to GND
9	SCK0	RSCK	O	H	Serial clock for treatment device communication	49	P72	ISEL3	I		NPUT SELECTER switch input 3 (H : selected COAXIAL)
10	SO0	RSO	O	L	Serial output for treatment device communication	50	P71	ISEL2	I		NPUT SELECTER switch input 2 (H : selected OPTICAL)
11	SI0	RSI	I		Serial input for treatment device communication	51	P70	ISEL1	I		NPUT SELECTER switch input 1 (H : selected AES/EBU)
12	P24	XTAL	O	L	XTAL ON/OFF (selected digital when there is no FS converter : H)	52	VDD	VDD			Connected to VDD
13	P23	XEVCO	O	L	Encoder VCO ON/OFF (CD : H)	53	P127	SCAN4	O	L	Key matrix output 4
14	SCK1	FSCK	I/O	H	Mechanism controller, LSI serial clock	54	P126	SCAN3	O	L	Key matrix output 3
15	SO1	FSO	O	L	Mechanism controller, LSI serial output	55	P125	SCAN2	O	L	Key matrix output 2
16	SI1	FSI	I		Mechanism controller, LSI serial input	56	P124	SCAN1	O	L	Key matrix output 1
17	RESET	XRESET	I		µcom-RESET input (L : RESET)	57	P123	SCAN0	O	L	Key matrix output 0
18	P74	LDATA	O	L	Communication data output for LED driver	58	P122	KEYIN3	I		Key matrix input 3
19	P73	LCLOCK	O	L	Communication clock output for LED driver	59	P121	KEYIN2	I		Key matrix input 2
20	AVSS	GND	I		Connected to GND	60	P120	KEYIN1	I		Key matrix input 1
21	P17	XFUSE	O	H	LC89585 serial communication currentiy used (L)	61	P117	KEYIN0	I		Key matrix input 0
22	P16	LCK	O	L	Communication ratch output for LED driver	62	P116	ROT5	I		INPUT SELECTER switch input 5 (H : selected XLR LO)
23	P15	XVCO	O	H	PLL ON/OFF (selected digital when there is no FS converter : L(PLL oscillated))	63	P115	ROT6	I		INPUT SELECTER switch input 6 (H : selected LINE)
24	P14	FS_THR	O	H	FS through output (44.1kHz digital input when FS through ON : L)	64	P114	FINL_SEG	O	L	FINALIZE-seg output (Light on : H)
25	P13	DACLAT	O	H	Communication latch output for D/A converter	65	P113	SEG10	O	L	FL segment out put 10
26	P12	XRST	O	L	Mechanism controller, RESET output for ATIP decorder (L : RESET)	66	P112	SEG9	O	L	FL segment out put 9
27	P11	XOPT	O	L	selected opticaldigital input (L)	67	P111	SEG8	O	L	FL segment out put 8
28	P10	PRIM	I		Parallel, Remote control, Key switch input (A/D input)	68	P110	SEG7	O	L	FL segment out put 7
29	AVDD	VDD			Connected to VDD	69	P107	SEG6	O	L	FL segment out put 6
30	AVREF	VDD			Connected to VDD	70	P106	SEG5	O	L	FL segment out put 5
31	P04	ROT_DI	I		Direction distinction input of rotary encoder switch	71	VLOAD				
32	XT2		O		Not used	72	P105	SEG4	O	L	FL segment out put 4
33	VSS	GND			Connected to GND	73	P104	SEG3	O	L	FL segment out put 3
34	X1		I		System oscillation : 4.19MHz	74	P103	SEG2	O	L	FL segment out put 2
35	X2		O		System oscillation : 4.19MHz	75	P102	SEG1	O	L	FL segment out put 1
36	P37	SW1	I	L	Demonstration mode ON/OFF (fixed H : no demonstration mode)	76	P101	SEG0	O	L	FL segment out put 0
37	P36		O	L	Not used	77	P100	GLID10	O	L	FL grid out put 10
38	P35	ROT4	I		INPUT SELECTER switch input 4 (H : selected XLR HI)	78	FIP9	GLID9	O	L	FL grid out put 9
39	P34		O	L	Not used	79	FIP8	GLID8	O	L	FL grid out put 8
40	P33	RREQ	O	L	CE output for treatment device communication	80	FIP7	GLID7	O	L	FL grid out put 7

■ PE5073A (SERVO DIGITAL ASSY : IC204) • MECHANISM Control Microcomputer

● Pin Function

No.	Mark	Name	I/O	Int	Function	No.	Mark	Name	I/O	Int	Function
1	P32/SCK0/	MSCK	O(I)	H	Serial transfer clock output of clock synchronous type	41	P42/AD2	AD2	O	-	Data address line
2	P33/SCK0/	MSO	O(I)	H	Serial transfer data output of clock synchronous type	42	P41/AD1	AD1	O	-	
3	P34/TO0		O	L	Not used	43	P40/AD0	AD0	O	-	
4	P35/TO1	STCN0	O	L	Output for strategy adjustment (3T delay +30)	44	ASTB/	ASTB	O	-	Subordinate position address signal and external latch signal for external memory access
5	P36/TO2	FOK	I	-	Input of focus OK (Focus OK : "H")	45	Vss0	GND	-	-	GND of port
6	P37/TO3	LRST	O	L	Reset output for servo system and digital system IC : "L"	46	test	GND	-	-	Connect to Vss0
7	RESET	XRESET	I	-	Input of reset : "L"	47	P10/PWM0	SPSP	I	-	Spindle drive PWM output at spindle CAV
8	Vdd1	+5V	-	-	Positive power supplies other than port	48	P11/PWM1	DGAI	I	L	PLAY, REC for 18 minutes of CD, 12cmCD-R in outer : L PLAY, REC for 9 minutes of 8cmCD-R in outer : H
9	X2	CLOCK	I	-	Crystal connection terminal for system clock oscillation	49	P12/SCK2/	SQCK	I	H	Serial clock output only for CXD2585Q sub-Q
10	X1	CLOCK	-	-	Inputs to the terminal X1 when the clock is supplied from the outside	50	P13/SI2/	SQSI	I	-	Serial data input only for CXD2585Q sub-Q
11	Vss1	GND	-	-	GND other than port	51	P14/SO2/	SO2	I	H	Serial data output
12	P00	XECE	O	H	Enable output for test treatment device reading : "L"	52	P15	MREC		H	Serial handshake output to mode controller : "H"
13	P01	RECE	O	L	Laser diode record power ON : "H"	53	P16	D8CM	O	L	8cmCD-R disc : H
14	P02	NC	O	L	Not used	54	P17	NC	O	L	Not used
15	P03	NC	O	L	Not used	55	Vdd0	+5V	O		Positive power supplies of port
16	P04	IT5SEL	O	H	INTP5 terminal input switch ("H"=SENS, "L"=TOCP)	56	P70/ANI0	TEPP	I(A)	-	Peak to peak of tracking error (for tracking gain adjustment)
17	P05	XEXSC	O	H	LC89585 external synchronization enable output : "H"	57	P71/ANI1	RFT	I(A)	-	The upper side envelope of playback RF (A/D input)
18	P06	XASYNC	O	H	ATIP frame sink : "L"	58	P72/ANI2	RFB	I(A)	-	The lower side envelope of playback RF (A/D input)
19	P07	XENCE	O(I)	H	LC89585 serial enable output : "H"	59	P73/ANI3	TEMP	I(A)	-	Temperature sensor (A/D input)
20	P67/	CLV	O	H	Spindle servo CLV/CAV mode	60	P74/ANI4	RFOPC	I(A)	-	Return light 1 for running OPC (A/D input)
21	P66/	ECLV	O	H	Spindle servo EFM/Wobble CLV mode	61	P75/ANI5	VWDC2	I(A)	-	Return light 2 for running OPC (A/D input)
22	P65/WR	XWR	O	L	Strobe signal output for reading operation of external memory	62	P76/ANI6	TRAY	I(A)	-	Loading position (A/D input) (OPEN/CLAMP)
23	P64/RD	XRD	O	L	Strobe signal output for writing operation of external memory	63	P77/ANI7	AD7	I(A)	-	Not used (A/D input)
24	P63/A19	XLT	O	H	Latch output only for CXD2585Q command	64	AVdd	+5V	-	-	Positive power supply for A/D converter
25	P62/A18	SSCK	O	H	Serial clock output for CXD2585Q and AK8563 command	65	AVref1	+5V	-	-	Standard voltage impression for A/D converter
26	P61/A17	SSO	O	H	Serial data output for CXD2585Q and AK8563 command	66	AVss	GND	-	-	GND for A/D converter
27	P50/A16	ALAT	O	H	Latch output only for AK8563 command	67	ANO0	WREF	I(A)	-	Record power 1 (D/A output)
28	P57/A15	SCLK	O	H	Serial clock output for CXD2585Q Serial Read Out	68	ANO1	VWDC2R	I(A)	-	Record power 2 (D/A output)
29	P56/A14	TP_2P	O	L	Test output port	69	AVref2	+5V	-	-	Standard voltage impression 2 for A/D converter
30	P55/A13	TP_1P	O	L		70	AVref3	GND	-	-	Standard voltage impression 3 for A/D converter
31	P54/A12	LDPW4	O	L	Output setting of record laser power	71	P20/INTP0	XPFAIL	I	-	Power failure detection
32	P53/A11	LDPW3	O	L		72	P21/INTP0	FG	I	-	Spindle FG detection
33	P52/A10	LDPW2	O	L		73	P22/INTP1	ATIP	I	-	ATIP sync detection
34	P51/A9	LDPW1	O	L		74	P23/INTP2/	SCOR	I	-	CXD2585 frame sync detection
35	P50/A8	LDPW0	O	L		75	P24/INTP3	SUBSYNC	I	-	LC89585 frame sync detection
36	P47/AD7	AD7	O	-	Data address line	76	P25/INTP4/	XRFDT	I	-	EFM prayback RF is detected : L
37	P46/AD6	AD6	O	-		77	P26/INTP5	IT5IN	I	-	TOC position sensor (TOC position (="L")), CXD2585Q SENS signal input
38	P45/AD5	AD5	O	-		78	P27/SI0	MSI	I	-	Serial transfer data input of clock synchronous type
39	P44/AD4	AD4	O	-		79	P230/SI1	MACK	I	-	Serial handshake input to mode controller : "L"
40	P43/AD3	AD3	O	-		80	P31/S0O1	XFUSE	I	-	"L" when communication between LC8985 and Mode contoroller

■ PDJ014A (SERVO DIGITAL ASSY : IC205)

• ATIP DECODER

"External Port"-output from PDJ014A (External RAM area (2C000H to 2C0FFH)

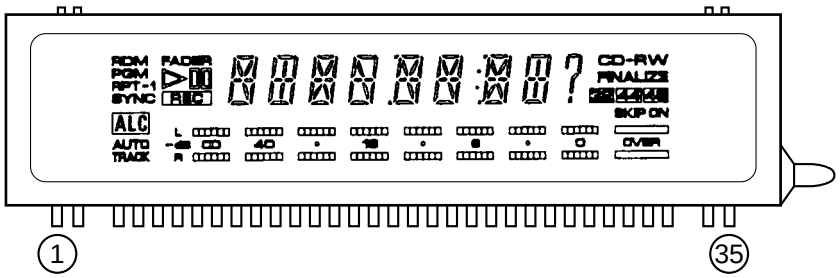
● Pin Function

No.	Mark	Name	I/O	Int	Function
45	POA0	GAINUP1	O	L	Gain switch for CD-RW (CD-RW="H")
46	POA1	CDROPC	O	L	AC circuit control Signal for CD-R running OPC
47	POA2	GAINUP3	O	H	Temperature correction output of bias power for CD-RW
49	POA3		O	H	Not used
50	POA4	PHYERS	O	L	Physical Erase : "H"
51	POA5	SSEL	O	L	Tracking error envelope detection, reset "L"
52	POA6	AGCON	O	L	ON/OFF of AGC circuit for Wobble extraction
53	POA7		O	L	Not used
54	POB0	LOUT	O	L	Loading open "H"
55	POB1	LIN	O	L	Loading close "H"
56	POB2		O	L	Not used
57	POB3	EECS	O	L	Enable output for writing and reading EEPROM data
59	POB4	STCN4	O	L	Strategy control output
60	POB5	STCN3	O	L	
61	POB6	STCN2	O	L	
62	POB7	STCN1	O	L	
63	POC0	TEG2	O	H	Gain adjustment of tracking error amplifier
64	POC1	TEG1	O	H	
65	POC2	TEG0	O	H	
66	POC3	RW/XR	O	L	CD-RW/other switch (CD-RW="H")
67	POC4		O	H	Not used
69	POC5	XCD	O	L	CD/other switch (CD="L")
70	POC6	ENBL	O	L	LD ON/OFF output
71	POC7	XAMUTE	O	L	Final steps mute of audio "L" (following the instruction of the mode controller)

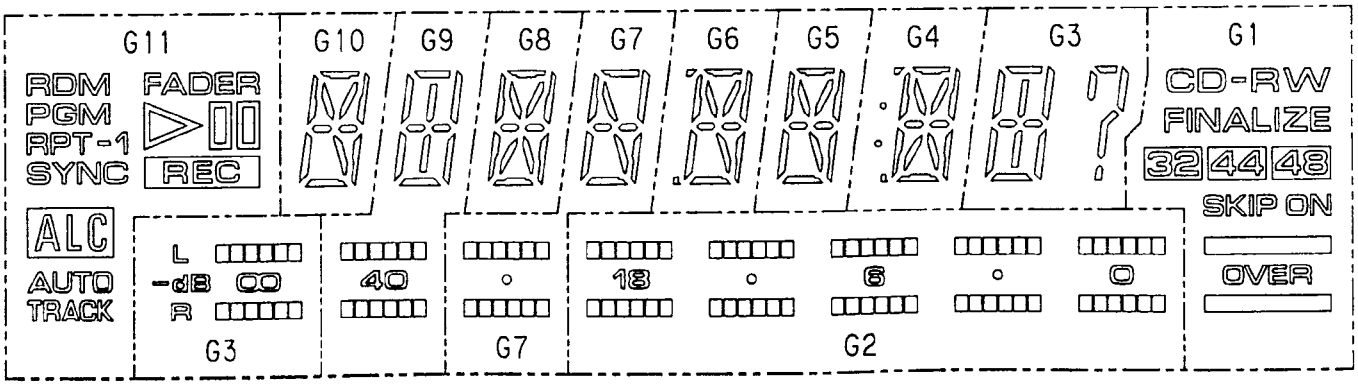
7.1.2 DISPLAY

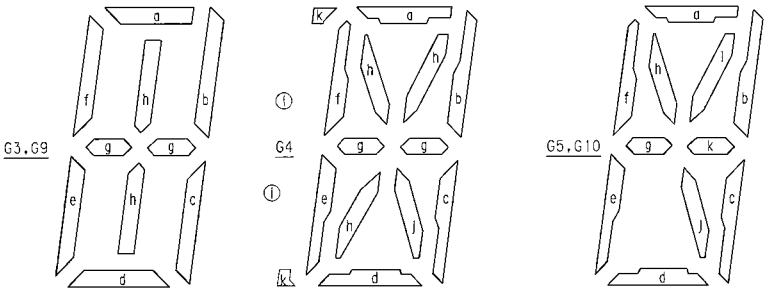
■ PEL1097 (FUNCTION ASSY : V701)

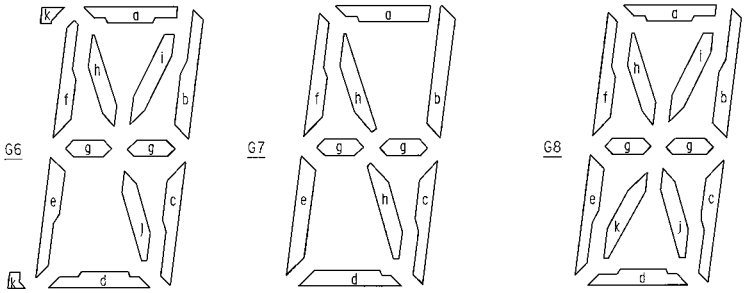
• FL TUBE

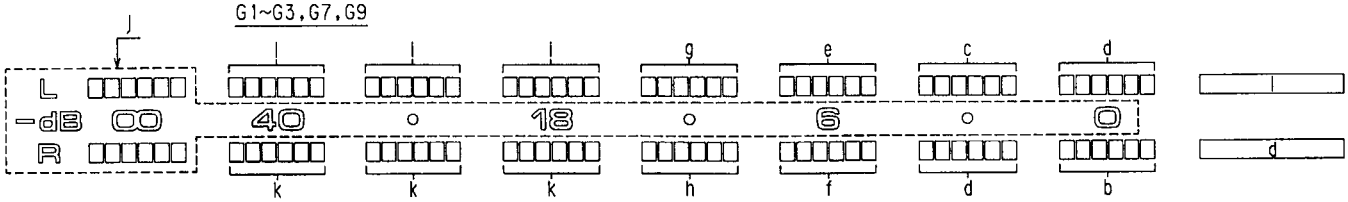


• Anode & Grid Assignment









	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11
S1	a	a	a	a	a	a	a	a	a	a	FADER
S2	OVER	b	b	b	b	b	b	b	b	b	
S3	(CD-R)W	c	c	c	c	c	c	c	c	c	
S4	32	d	d	d	d	d	d	d	d	d	REC
S5	44	e	e	e	e	e	e	e	e	e	RDM
S6	CD(-RW)	f	f	f	f	f	f	f	f	f	PGM
S7	(CD)-R(W)	g	g	g	g	g	g	g	g	g	RPT
S8	ON	h	h	h	h	h	h	h	h	h	-1
S9	i	i		i	i	i	i	i	i	i	SYNC
S10	48	j	j	j	j	j	j	j	j	j	ALC
S11	SKIP	k		k	k	k	k	k	k	k	AUTO TRACK
S12	FINALIZE										

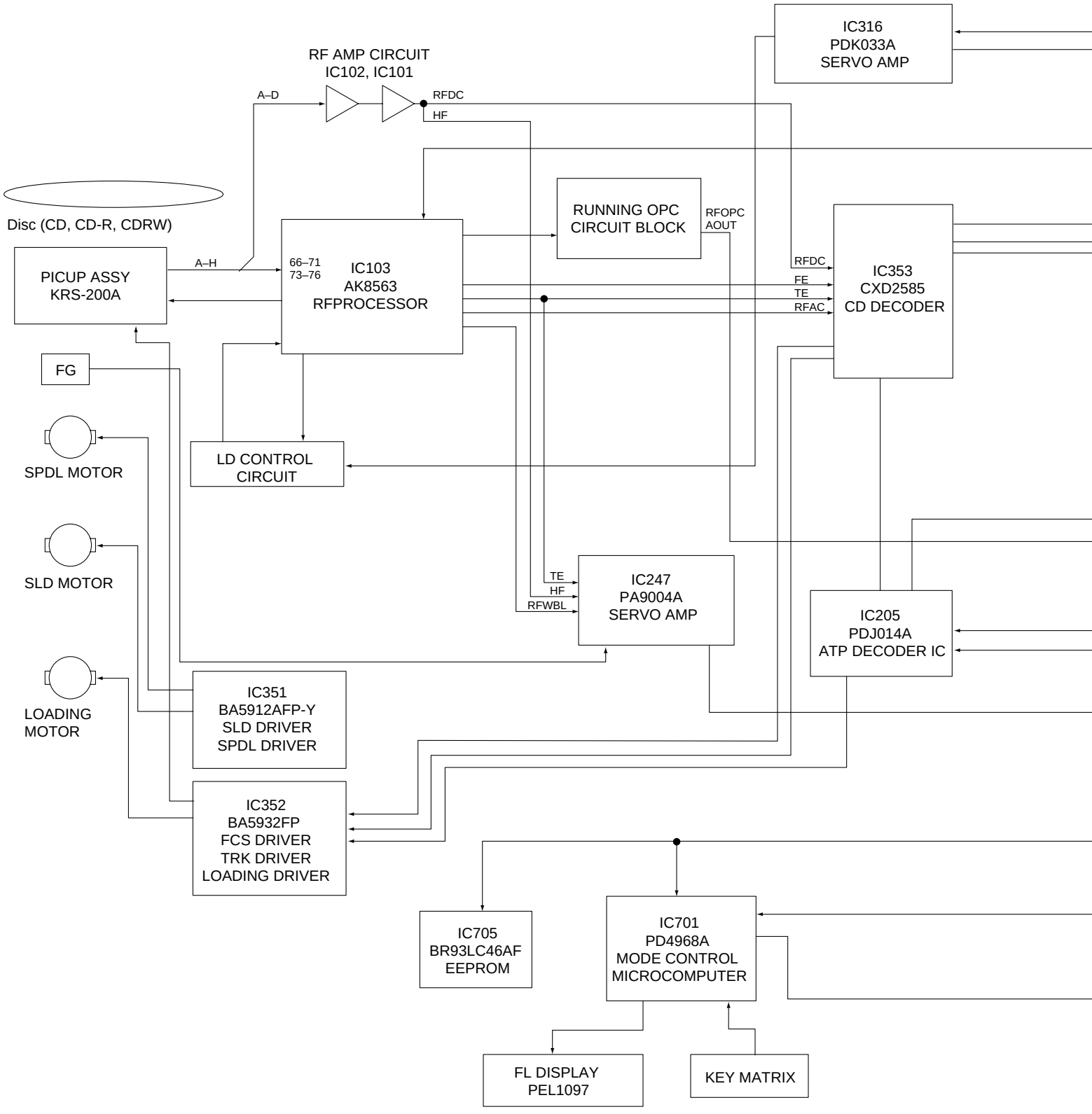
• Pin Assignment

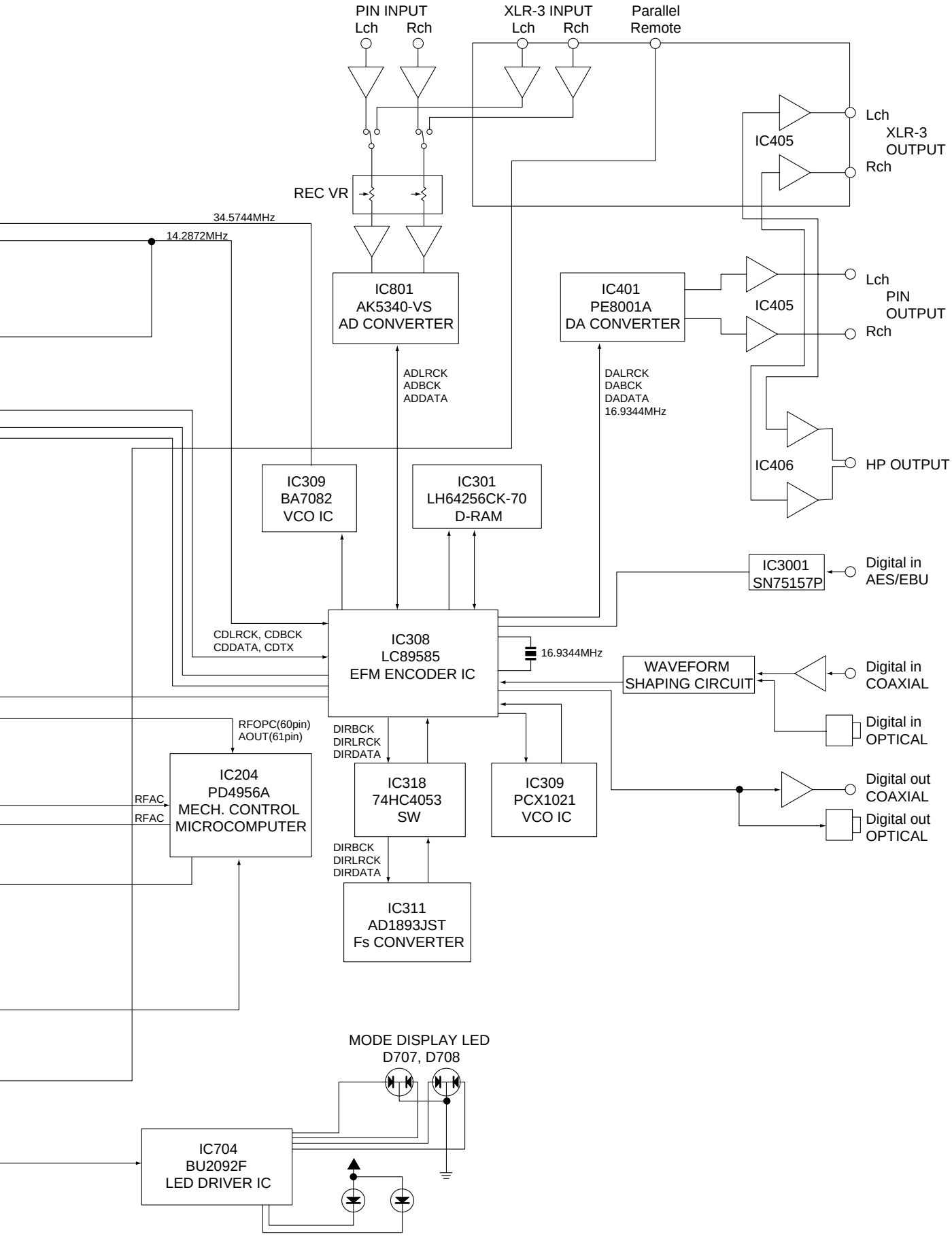
Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Assignment	F1	F1	NP	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	G11	G10	G9	G8

Pin No.	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Assignment	G7	G6	G5	G4	G3	G2	G1	S12	NL	NL	NL	NL	NL	NL	NP	F2	F2

F1,F2:Filament G1~G11:Grid S1~S12:Anode NP:No Pin NL:No Lead

7.2 BLOCK DIAGRAM

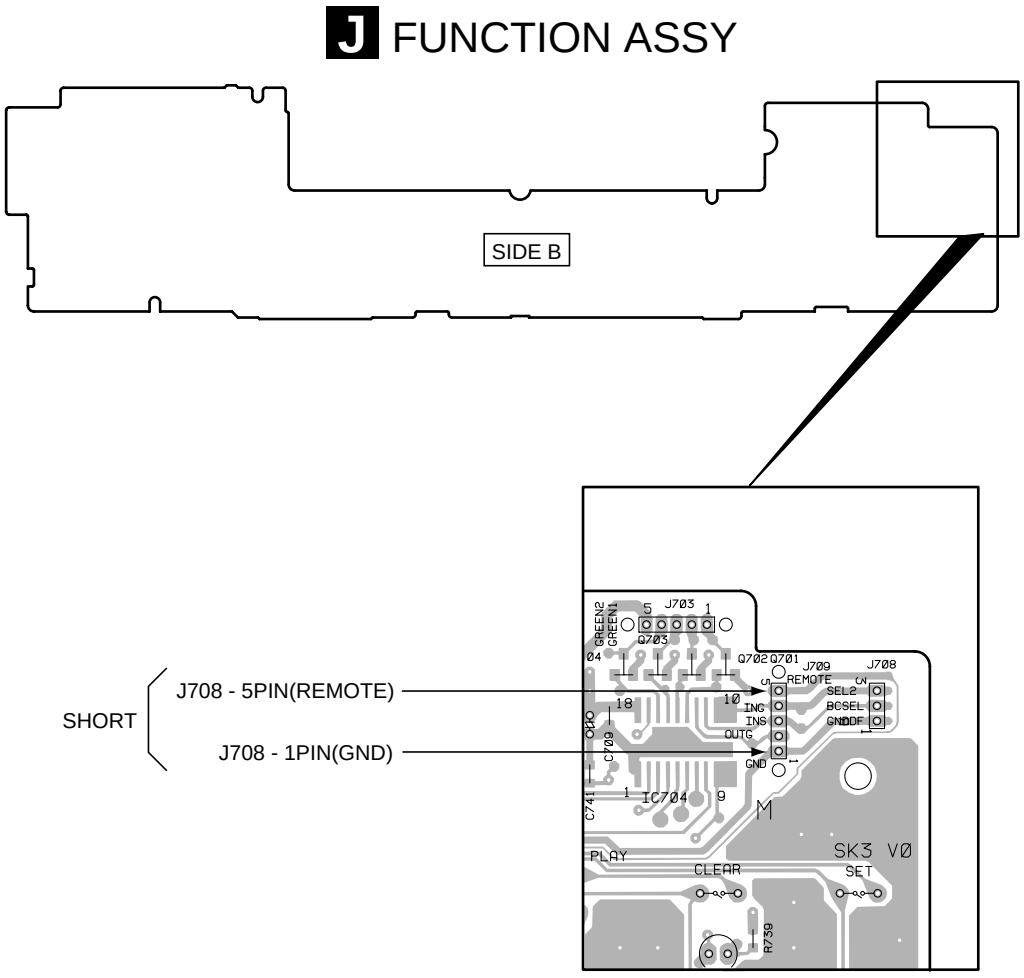



PIN INPUT
Lch
Rch
XLR-3 INPUT
Lch
Rch
Parallel
Remote
IC405
Lch
XLR-3
OUTPUT
Rch
REC VR
34.5744MHz
14.2872MHz
IC801
AK5340-VS
AD CONVERTER
IC401
PE8001A
DA CONVERTER
IC405
Lch
PIN
OUTPUT
Rch
ADLRCK
ADBCK
ADDATA
DALRCK
DABCK
DADATA
16.9344MHz
IC406
HP OUTPUT
IC309
BA7082
VCO IC
IC301
LH64256CK-70
D-RAM
IC3001
SN75157P
Digital in
AES/EBU
CDLRCK, CDBCK
CDDATA, CDTX
IC308
LC89585
EFM ENCODER IC
16.9344MHz
WAVEFORM
SHAPING CIRCUIT
Digital in
COAXIAL
Digital in
OPTICAL
RFOPC(60pin)
AOUT(61pin)
DIRBCK
DIRLRCK
DIRDATA
IC204
PD4956A
MECH. CONTROL
MICROCOMPUTER
RFAC
RFAC
IC318
74HC4053
SW
IC309
PCX1021
VCO IC
Digital out
COAXIAL
Digital out
OPTICAL
DIRBCK
DIRLRCK
DIRDATA
IC311
AD1893JST
Fs CONVERTER
MODE DISPLAY LED
D707, D708
IC704
BU2092F
LED DRIVER IC

7.3 DIAGNOSIS

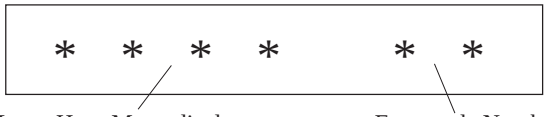
7.3.1 Diagnosis method when INPUT ASSY is removed.

This product operates even if there is no INPUT ASSY when the terminal of the figure below is shorted.



7.3.2 Laser Hour Meter display and Error code display for service.

CDR-850 can be displayed the total of the lighting time of Laser diode and the error code for service.
When this product keeps pushing the STOP key in the TEST mode (potitioin of INPUT selector AES/EBU in ST0P) for about five seconds, the following displays are done by FL display.



Laser Hour Meter display Error code Number

Four digit in the left of FL : Total lighting time of laser diode.
Two digit in the right of FL : Error code for service.

0-5100 hours are displayed at the total lighting time of laser diode.
As for the error code for service, Error Number displayed as "CHECK DISC" or "CHECK" is displayed.
Refer to the attached table to the content.

As for the initialization of the total lighting time of laser diode, when you keeps pushing the MENU key and the SKIP SET key at the same time for five seconds when this product is STOP at the AES/EBU position of the INPUT selector in the TEST mode is initialized.
"CLEAR" is displayed in FL display, and the total time is cleared.

Initialization of error code display.
When the power is turned on again, the error code is automatically cleared.

• Service Codes and Countermeasures

Code	Contents	Location of Fault	Cause	Checkpoint
H0	Unit does not operate even when the cord is inserted into outlet. (CHECK displayed)	H0 : Communication is NG in mechanism controller, mode controller.	• Faulty soldering. • Pattern short-circuit.	IC204 (mechanism controller) IC205 (PDJ006)
H1		H1 : Mechanism controller detected faurt in circuit.	• Parts short-circuit. • Faulty power.	IC203 (HD74HC573)
H2	Recording preparations cannot be performed, tray does not open.	H2 : Mechanism controller pins 22, 23, 24 pin input voltage error.		IC247 (PA9004)
H5	Recording impossible. (CHECK displayed)	IC705	• IC705 fault.	IC705 (BR93LC46LF)
L*	Unit stops during tray open/close. (CHECK displayed)	Loading section fault has been detected.	• Faulty tray position sensor. • Faulty loading motor. • Faulty soldering, pattern short-circuit. • Pattern short-circuit, faulty power.	IC352 (BA5932)
E*	Operations stop when disc is inserted, playback start is requested, REC/PAUSE is requested, and operations are acknowledged. (CHECK displayed)	Slider section fault has been detected. • Pickup could not be moved to designated position.	• Flexible cable absent. • Faulty drive circuit. • Faulty TOC position SW. • Faulty soldering, pattern short-circuit.	S601 (MPU10230) IC352 (BA5932) IC353 (CXD2585)
P*	Unit stops when disc is inserted without reading the internal information. (CHECK DISC displayed)	Spindle section fault has been detected. • Back side of disc has been inserted. • Disc with scratches or dusts has been inserted. • Disc could not be rotated normally. • Designated signal could not be obtained from disc.	• Faulty spindle motor. • Faulty spindle drive circuit. • Error in FG detection. • Faulty WBL circuit. • Faulty decoder circuit. • ATIP, sub codes cannot be read. • Error rate is high.	PC651 (NJL5803K) IC352 (BA5932) IC353 (CXD2585)

Code	Contents	Location of Fault	Cause	Checkpoint
C*	Operations stop before REC/PAUSE is set. (CHECK displayed)	Recording laser power related fault has been detected. • Disc with scratches or dusts has been inserted. • Proper recording power is not output. • RF detection is not normal.	• Faulty laser diode. • Error in RF detection. • Faulty RFT, RFB circuit. • Insufficient recording power. • Faulty soldering, pattern short-circuit. • Pattern short-circuit, faulty power. • ATIP, sub codes cannot be read.	IC247 (PA9004) IC103 (AK8563) IC208 (TC7S04) IC209 (TC7S14)
F*	Operations stop during playback or recording. (CHECK displayed)	Pickup section fault has been detected. • Disc with scratches or dusts has been inserted and therefore no focus. • Proper laser power is not output. • No focus.	• Faulty laser diode. • Faulty focus drive circuit. • Faulty pickup. • Faulty soldering, pattern short-circuit. • Pattern short-circuit, faulty power.	IC352 (BA5932) IC353 (CXD2585)
A*	CHECK DISC is displayed and unit stops during recording related operations.	Stop has been detected during recording. • Disc scratches, dusts, etc.are obstructing operations and unit has stopped.	If hardware problems have occurred, before A* and d* numbers are generated, codes other than those above are generated and the unit stops. Consequently, these service codes are generated only when operational problems have occurred due to the disc. Faulty soldering, pattern short-circuit Possible if pattern has short-circuit or power is faulty.	
d*	CHECK DISC is displayed and unit stops during recording related operations. Disc internal information cannot be read and unit stops when disc is inserted.			

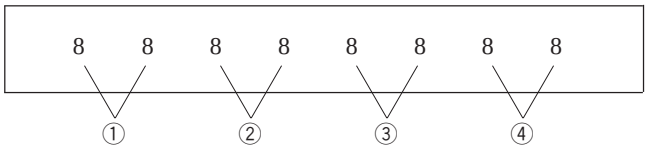
Note) * indicates the mechanism mode and are the following numbers.

No.	Mechanism Mode	No.	Mechanism Mode
0	PLAY	8	Search
1	OPEN	9	REC/PAUSE
2	STOP	A	REC
3	–	B	TOC REC
4	–	C	OPC
5	Setup	D	TOC check
6	TOC read	E	PMA, actual pause recording
7	–		

7.3.3 About the detailed error code

In CDR-850, when "SKIP PLAY" key and "MENU" key are pushed at the same time on the ordinary mode, the error code of details is displayed in FL display. As for the error code of details, the packing improvement is not done. When the power supply is turned off, the error code of details is deleted.

The display of eight digits is as follows.



The value of two digits (eight digits in total) displayed in ①-④ is displayed as follows.

Two digits displayed in ① : Operation when figure of digit of subordinate position does error detection.

* 0: Uncertainty
* 1: Tray OPEN
* 2: Tray CLOSE or STOP
* 3: SET_UP (disk start-up)
* 4: TOC and PMA lead (SET_UP is included)

* 5: PLAY
* 6: SERCH
* 7: REC/PAUSE
* 8: REC
* 9: Lead OUT REC

* A: TOC REC
* B: PMA REC
* C: Power CALIBRATION
* D: TOC CHECK
* E: ACTUAL PAUSE REC

* F: Uncertainty

However, when "F1" is displayed in ②, the NG pin number of mechanism contoller is displayed in ①.

Two digits displayed in ② : Error mode.

Mode No. or even 0-79 is an error where mechanism contoller is generated.

Mode No.; Mode name.

00; Irregular mode (An internal uncertain state, at hard reset).
01; Invalid mode.
02; STOP.
03; Laser diode turning on (reproduction power).
04; Focus 0N.

05; Spindle ON.
06; Tracking ON.
07; DIRC use direct sequence forward 1 truck jump.
08; DIRC use direct sequence reverse 2 truck jump.
09; DIRC use direct sequence forward 1 truck Jump repeat.

10; DIRC use direct sequence reverse 1 truck Jump repeat.
11; Auto sequence 10 truck forward jump repeat.
12; Auto sequence 10 truck reverse jump repeat.
13; Auto sequence 50 truck forward jump repeat.
14; Auto sequence 50 truck reverse jump repeat.

15; Auto sequence forward M truck move.
16; Auto sequence reverse M truck move.
17; PAUSE.
18; PLAY.
19; Seek truck 0.

20; Search at blank.
21; REC.
22; REC to PAUSE (REC END).
23; ATIP TIME search.
24; Q code TIME search.

25; Q code truck search.
26; forward 300 truck move.
27; reverse 300 truck move.

30; TOC area search.
31; Tray open.
32; Tray close.
33; Setup (to PLAY).
34; TOC lead.

35; PLAY normal.
36; Search to PLAY.
37; REC PAUSE.
39; Lead out REC.

40; TOC REC (lead Inn).
41; PMA REC.
42; PCA REC.
43; TOC check.
44; ACTUAL REC PAUSE.

45; Initialization.
47; 2Tr JUMP specification at PAUSE.
48; 1Tr JUMP specification at PAUSE.

51; Search to PAUSE.
52; PMA lead.
53; Ratings record of Laser diode power output.
54; Searches the area where is Q code.

57; maximum record ofLaser diode power output.
58; Record power of Laser diode continuous sweep mode.
59; Slider forward move.

60; Slider reverse move.
61; The line speed and the track pitch of the disk are calculated by T0 and Tl measurement.
62; Auto sequence 1 truck forward jump.
63; Auto sequence 1 truck reverse jump.
64; Auto sequence 1 truck forward jump repeat.

65; Auto sequence 1 truck reverse jump repeat.
66; Auto sequence 10 truck forward jump.
67; Auto sequence 10 truck reverse jump.
68; Scanning mode which uses auto sequence 10 truck forward jump (It is a sound).
69; Scanning mode which uses auto sequence 10 truck reverse jump (It is a sound).

70; Auto sequence 50 truck forward jump.
71; Auto sequence 50 truck reverse jump.
72; High-speed scanning mode which uses auto sequence 50 truck forward jump.
73; High-speed scanning mode which uses auto sequence 50 truck reverse jump.
74; The number of jumps in forward DTRNUM by combining auto sequence 2N truck jump.

75; The number of jumps in reverse DTRNUM by combining auto sequence 2N truck jump.
76; REC mode continuance processing after power failure returns.
78; Search at blank.
79; Return mode when "Picup jump" and "Coming off by focus" are generated in REC.

Error where mechanism contoller is generated.

91; Loading error.
C7; Not REC/PAUSE of Power CALIBRATION though 60 seconds passed.
d0; This product stops for NG or the ST0P key input in Redum.
d4; Data has not become complete by TOC and PMA lead.
d7; RF check NG at REC/PAUSE.

db; PMA/REC will not end in 60 seconds.
dd; This product stops for the TOC check error or the STOP key input.
d f; Not REC/PAUSE in 60 seconds, The REC beginning cannot be done in ten seconds.
The return after Picup jump will not end in 60 seconds.
F0; mechanism contoller communication error.
F1; mechanism contoller hardware error : In this case, the NG pin number of mechanism contoller is displayed in TRACK.

F2; mechanism contoller A/D input (RFT,RFB) error.
F5; Serial Namber error forRID.

Two digits displayed in ③ : Recording sub-mode when error generation is done.

10: REC/PAUSE is being set.
20: REC/PAUSE is being.
30: REC is being.
40: REC stop is being.
50: Unlock and SCMS is stopping.

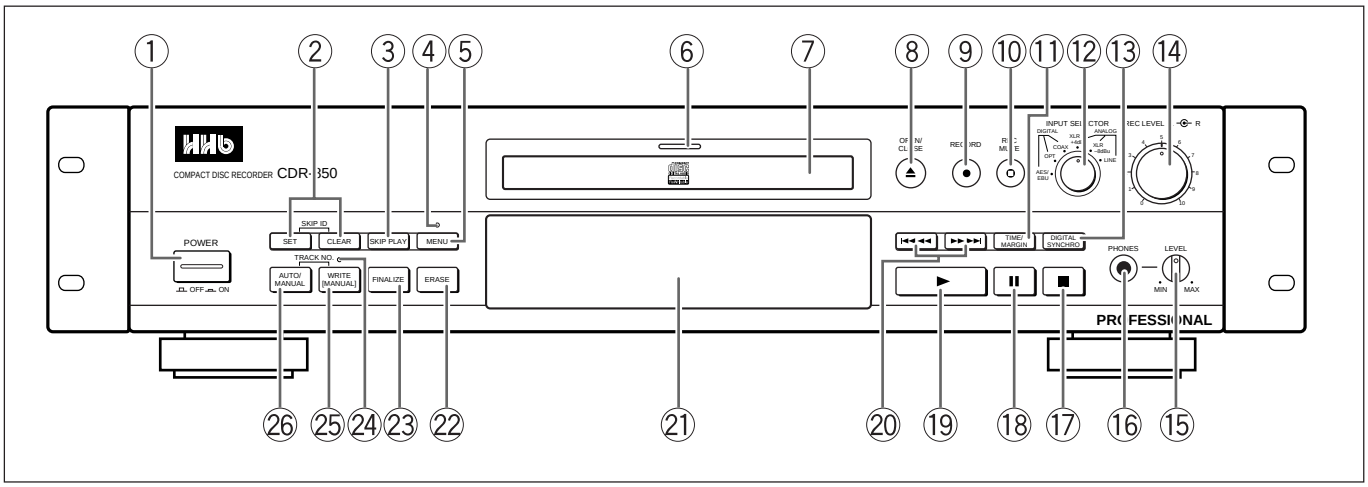
Two digits displayed in ④ : Other states when the error generation is done are displayed by the HEX code.

bit7: Focus coming off.
bit6: Synchronization coming off is detected at REC.
bit5: Picup jump detection at REC.
bit4: TOC lead error (Data does not become complete).
bit3: The A/D value is abnormal of RFT and RFB.
bit2: There is no meaning.
bit1: There is no meaning.
bit0: There is no meaning.

8. PANEL FACILITIES AND SPECIFICATIONS

• PANEL FACILITIES

FRONT PANEL



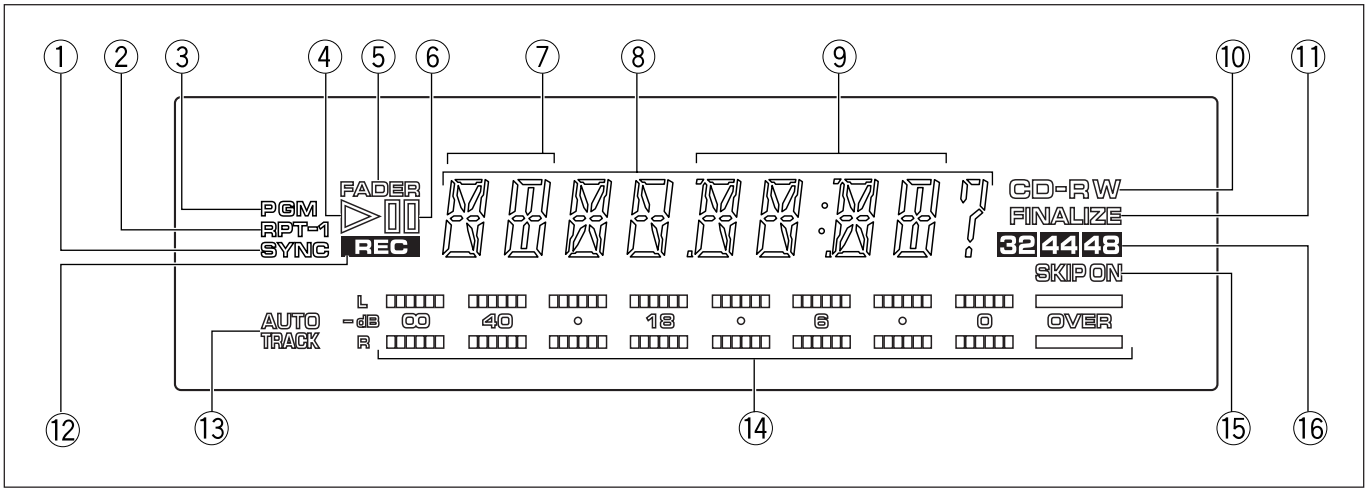
The operations available using buttons marked (*) are also available using the buttons with the same names or inscriptions on the remote control unit.

① POWER switch
② SKIP ID SET, CLEAR buttons
③ SKIP PLAY button
④ COPY-BIT indicator
⑤ MENU button
⑥ Function indicator

Recording ..... Lights red
Recording mute and writing to (PMA) ... Blinks red
Playback ..... Lights green
Preparing to erase ..... Blinks orange
Erasing ..... Lights orange

⑦ Disc tray
⑧ OPEN/CLOSE ⏏ button
⑨ RECORD ● (record) button*
⑩ REC MUTE ○ (record muting) button*
⑪ TIME/MARGIN button*
⑫ INPUT SELECTOR knob
⑬ DIGITAL SYNCHRO button
⑭ REC LEVEL (recording level) knobs (outer: Left, inner: Right)
⑮ PHONES LEVEL (headphone level) control
⑯ PHONES (headphones) jack
⑰ ■ (stop) button*
⑱ II (pause) button*
⑲ ► (play) button*
⑳ |◄◄ ◄◄, ►► ►►| (search) buttons*
㉑ Display panel
㉒ ERASE button
㉓ FINALIZE button
㉔ TRACK NO. WRITE (MANUAL) indicator
㉕ TRACK NO. WRITE (MANUAL) button*
㉖ TRACK NO. AUTO/MANUAL button

DISPLAY PANEL



① SYNC
Lights when automatic digital-source synchro recording is activated.

② RPT-1
Lights during repeat playback.

③ PGM
Lights in the program mode.

④ ▷
Lights during playback.

⑤ FADER
Blinks during fade-in/out.

⑥ ▯▯
Lights or blinks during pause.

⑦ Track display
Displays the track number.

⑧ Character display
Displays messages.

⑨ Time display
Displays the elapsed playing time, remaining playing time, total playing time, elapsed recording time, remaining recording time, total recording time and remaining time until the end of finalization.

⑩ CD-RW
Blinks during disc identification and lights steadily when the disc format is recognized.

CD: Lights if the loaded disc is a pre-recorded CD or finalized CDR.

CDR: Lights if the loaded disc is a CD-R disc that is not finalized.

CD-RW: Lights if the loaded disc is a CD-RW disc.

⑪ FINALIZE
Lights if the loaded disc is a finalized CD-RW disc60 and.

⑫ REC
Lights during record mode. Blinks in the record muting mode.

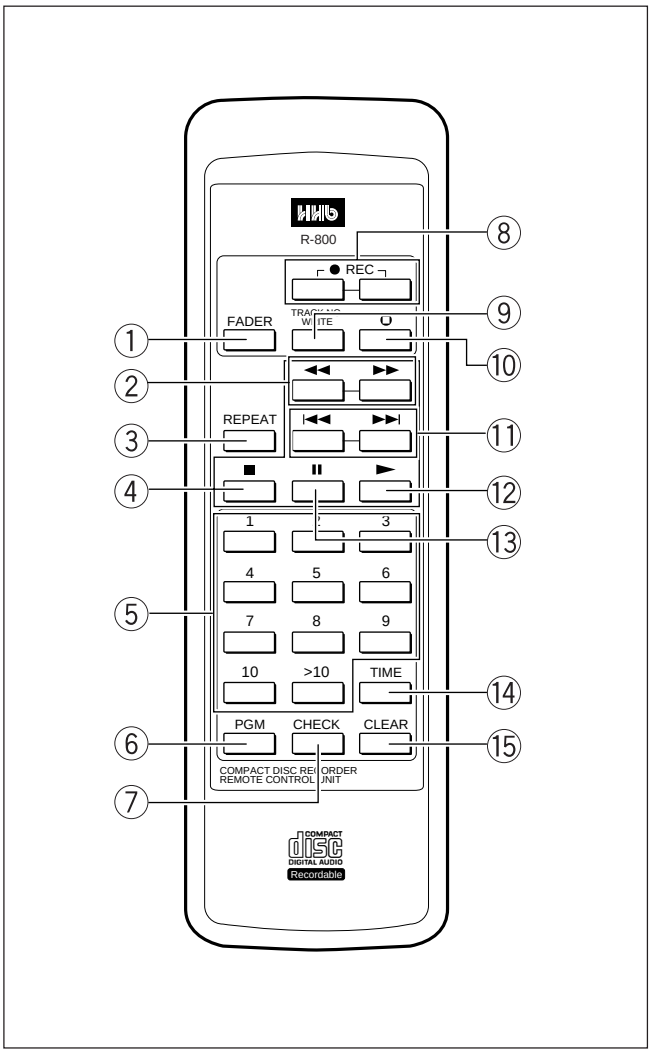
⑬ AUTO TRACK
Lights when automatic track number write during recording is activated.

⑭ Signal level indicator
Displays the input level during record or the play level during playback.

⑮ SKIP ON
Lights, goes off or blinks during skip ID setting or clearing.

⑯ Sampling frequency indicator
Displays the sampling frequency (Fs) of the current digital input. All indicators are turned off when the input signal is interrupted.

REMOTE CONTROL UNIT



Functions of the remote control unit

Operations performed by buttons marked (*) can also be carried out by using buttons with the same name on the main unit.

① **FADER button**
② **◄◄/►► (manual search) buttons***
③ **REPEAT button**
④ **■ (stop) button***
⑤ **Numeric buttons 1 to 10, >10**
⑥ **PGM (program) button**
⑦ **CHECK (program check) button**
⑧ **● REC (record) buttons***
To record, press the 2 buttons simultaneously.
⑨ **TRACK NO. WRITE (manual) button***
⑩ **O (record muting) button***
⑪ **|◄◄/►►| (track search) buttons***
⑫ **►(play) button***
⑬ **II (pause) button***
⑭ **TIME button***
⑮ **CLEAR (program clear) button**

• SPECIFICATIONS

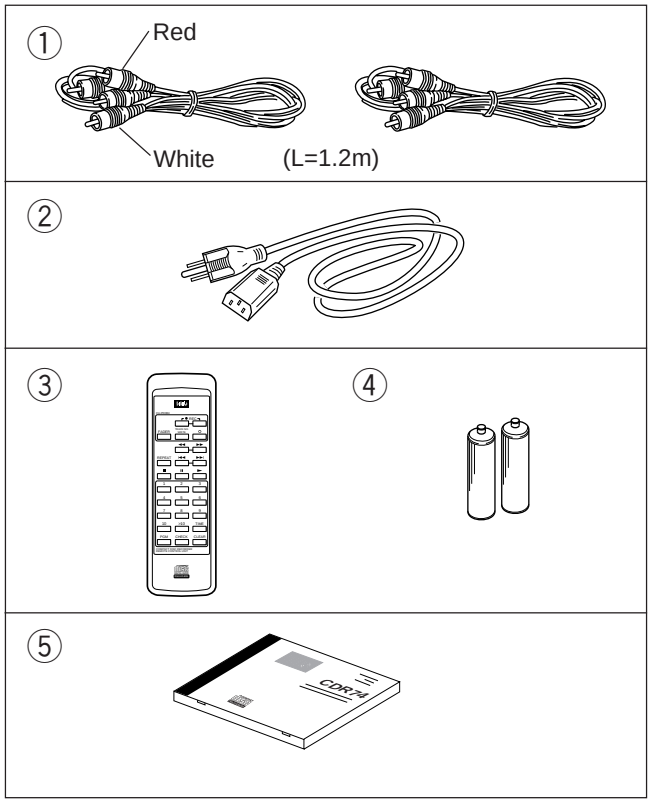
1. GENERAL

Model ..... Compact disc audio system
Applicable discs ..... CDs, CD-Rs and CD-RWs
Power supply
U.S. models ..... AC 120 V, 60 Hz
European models ..... AC 220 – 230 V, 50/60 Hz
Power consumption ..... 24 W
Operating temperature ..... +5°C to +35°C (+41°F to 95° F)
Weight (without package) ..... 7.0 kg (15.4 lb)
Max. dimensions ..... 482 (W) x 393 (D) x 105 (H) mm
19 (W) x 15-1/2 (D) x 4-1/8 (H) in.

2. AUDIO UNIT

Frequency Response ..... 2 Hz to 20 kHz ± 1 dB
Playback S/N ..... 109 dB
Playback Dynamic Range ..... 98 dB
Playback T.H.D. 0.0022%
Recording Analog S/N ..... 92 dB
Recording Analog Dynamic Range ..... 93 dB
Recording Analog T.H.D. 0.006%
Recording Digital S/N ..... 108 dB
Recording Digital Dynamic Range ..... 97 dB
Recording Digital T.H.D. 0.0022%
XLR O/P level (0 dBfs: >10 kΩ load) ..... 20 ± 1 dBu
RCA O/P level (0 dBfs: >10 kΩ load) ..... 8 ± 1 dBu
Wow & Flutter ..... Un-measurable (±0.001% W.PEAK)
Number of channels ..... 2 (stereo)

All measurements are to EIAJ standards.



3. INPUT CONNECTORS

Analog XLR-3 type (input impedance: 10 kΩ)
Nominal level +4/–8 dBu switchable
Analog RCA Phono type (input impedance: 10 kΩ)
Optical Digital Input (SPDIF)
Coaxial Digital Input (SPDIF - impedance 75 Ω)
AES/EBU Digital Input (balanced - impedance 110 Ω)
Remote Control Connector ..... 8 pin DIN

4. OUTPUT CONNECTORS

Analog XLR-3 type nominal level +4/–8 dBu (menu select)
Analog RCA Phono type
Optical Digital Output (SPDIF)
Coaxial Digital Output (SPDIF - impedance 75 Ω)

5. ACCESSORIES

- Power cord
- Remote control unit
- 2 x size AAA/R03 dry cell batteries
- 2 x audio cables
- Operating Instructions
- HHB CDR-74 silver disc
- HHB Recording Media Guide
- HHB Registration Card

6. PICK UP

- Laser wavelength (λ) ..... 778 to 787 nm
- Object lens out (3 beam total) 23mW
- Laser class ..... IIIb

NOTE:
The specifications and design of this product are subject to change without notice, due to improvements.

①Audio cables ... x 2 : PDE1003 (L=1.2m)
(analog recording input, analog playback output)
②AC power cord : DDG1072 (MY TYPE)
: DDG1028 (KU/CA TYPE)
③Remote control unit : PWW1122 (R-800)
④AAA/R03 dry cell batteries ... x 2
⑤HHB CD-R disc : PEX1007

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